SONY

MULTI ACCESS VIDEO AND AUDIO SERVER

MAV-70

MPEG ENCODER/DECODER BOARD
BKMA-7010

MPEG ENCODER BOARD
BKMA-7020

MPEG DECODER BOARD
BKMA-7030

INTERFACE BOARD
BKMA-7040

A/D CONVERTER BOARD
BKMA-7050

D/A CONVERTER BOARD
BKMA-7060

REDUNDANT POWER SUPPLY UNIT
BKMA-PS70

MAINTENANCE MANUAL
Volume 1 1st Edition

⚠警告

このマニュアルは，サービス専用です。
お客様が，このマニュアルに記載された設置や保守，点検，修理など行うと感電や火災，人身事故につながることがあります。
危険をさけるため，サービストレーニングを受けた技術者のみご使用ください。

⚠WARNING

This manual is intended for qualified service personnel only.
To reduce the risk of electric shock, fire or injury, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.

⚠WARNUNG

Die Anleitung ist nur für qualifiziertes Fachpersonal bestimmt.
Alle Wartungsarbeiten dürfen nur von qualifiziertem Fachpersonal ausgeführt werden. Um die Gefahr eines elektrischen Schlages, Feuergefahr und Verletzungen zu vermeiden, sind bei Wartungsarbeiten strikt die Angaben in der Anleitung zu befolgen. Andere als die angegeben Wartungsarbeiten dürfen nur von Personen ausgeführt werden, die eine spezielle Befähigung dazu besitzen.

⚠AVERTISSEMENT

Ce manual est destiné uniquement aux personnes compétentes en charge de l’entretien. Afin de réduire les risques de décharge électrique, d’incendie ou de blessure n’effectuer que les réparations indiquées dans le mode d’emploi à moins d’être qualifié pour en effectuer d’autres. Pour toute réparation faire appel à une personne compétente uniquement.

MAV-70 (SY)	Serial No. 10001 and Higher
BKMA-7010 (SY)	Serial No. 10001 and Higher
BKMA-7020 (SY)	Serial No. 10001 and Higher
BKMA-7030 (SY)	Serial No. 10001 and Higher
BKMA-7040 (SY)	Serial No. 10001 and Higher
BKMA-7050 (SY)	Serial No. 10001 and Higher
BKMA-7060 (SY)	Serial No. 10001 and Higher
BKMA-PS70 (SY)	Serial No. 10001 and Higher

CAUTION

Danger of explosion if battery is incorrectly replaced.

Replace only with the same or equivalent type recommended by the manufacturer.
Dispose of used batteries according to the manufacturer's instructions.

Vorsicht!

Explosionsgefahr bei unsachgemäßem Austausch der Batterie.

Ersatz nur durch denselben oder einen vom Hersteller empfohlenen ähnlichen Typ.
Entsorgung gebrauchter Batterien nach Angaben des Herstellers.

ATTENTION

Il y a danger d'explosion s'il y a remplacement incorrect de la batterie.

Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur.
Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

ADVARSEL!

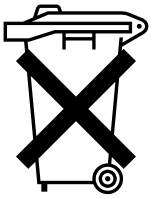
Lithiumbatteri-Eksplosionsfare ved fejlagtig håndtering.
Udskiftning må kun ske med batteri af samme fabrikat og type.
Levér det brugte batteri tilbage til leverandøren.

Voor de klanten in Nederland

Dit apparaat bevat een MnO_2-Li en $(CF)_n$-Li batterij voor memory back-up.

Raadpleeg uw leverancier over de verwijdering van de batterij op het moment dat u het apparaat bij einde levensduur afdankt.

Gooi de batterij niet weg. maar lever hem in als KCA.



Bij dit produkt zijn batterijen geleverd. Wanneer deze leeg zijn, moet u ze niet weggooien maar inleveren als KCA.

PRECAUTIONS

Use the specified part only

Component marked ⚠ are critical to safe operation. Therefore, specified parts should be used in the case of replacement.

Secure the unit to a rack with the screws

If the unit is not secured completely, this may cause the unit fall off, resulting in injury. Be sure to secure the unit with the screws when mounting to the rack.

Secure the power supply unit with the screws

If the power supply unit is not secured completely, the contact resistance of the power connector will be increased and may cause parts damage or smoking.

Warnings about the battery (Backup lithium battery)

When abnormal conditions are encountered,

- If smoking, turn off the dedicated circuit breaker or power switch, and unplug the appliance from the outlet.
- If a battery fluid gets in eyes, wash it off with water at once and go to a doctor.
- If a battery fluid spills on your clothing, wash it out with water at once.
- If a battery fluid is leaking, wipe it off and replace with a new battery.

To avoid the explosion and fire,

- Never recharge, short-circuit, take it apart, deform, heating, or dispose of in fire.
- Replace with the same model or a manufacturer-specified equivalent.
- Before disposing of it, cover the “+” and “–” poles with insulating tape to keep them from contact with a metal or other batteries.

To avoid the leakage,

- Set the polarity (+) of the battery to the polarity (–) of the board.

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Manual Structure

Purpose of this manual

This manual is the maintenance manual volume 1 of the MAV-70 Multi Access Video and Audio Server.
This manual is intended for use by trained system and service engineers, and describes the information that premise the service based on components replacement (diagnostics, replacement of main parts andboards, electrical alignment, and circuit descriptions).
Moreover, describes the information for the following optional boards/power supply unit.

- MPEG Encoder/Decoder Board BKMA-7010
- MPEG Encoder Board BKMA-7020
- MPEG Decoder Board BKMA-7030
- Interface Board BKMA-7040
- A/D Converter Board BKMA-7050
- D/A Converter Board BKMA-7060
- Redundant Power Supply Unit BKMA-PS70

Contents

The maintenance manual consists of “Volume 1” and “Volume 2”.
The following is a summary of all the section for understanding the contents of maintenance manual.

Maintenane Manual Volume 1

Section 1 Diagnostics
This section describes the menu, error message, and diagnostics, etc.

Section 2 Replacement of Main Parts and Boards
This section describes the removal of cabinet, replacement of main parts and boards.

Section 3 Electrical Alignment
This section describes the electrical alignment when maintenance.

Section 4 Circuit Descriptions
This section describes the circuit descriptions of main boards.

Maintenane Manual Volume 2

Section 1 Spare Parts
This section describes the spare parts.

Section 2 Semiconductor Pin Assignments
This section describes the pin assignments of semiconductors.

Section 3 Block Diagrams
This section describes the overall block diagram and main board block diagrams.

Section 4 Schematic Diagrams
This section describes the schematic diagrams for circuit boards and frame wiring.

Section 5 Board Layouts
This section describes the board layout for circuit boards.

Related manuals

Besides this maintenance manual, the following manuals are available for the MAV-70.

- **MAV-70 Operation Manual (Supplied with MAV-70)**
  This manual describes the operation and function of the MAV-70.

- **MAV-70 Installation Manual (Supplied with MAV-70)**
  This manual describes information regarding the installation of the MAV-70 and optional power supply unit BKMA-PS70.

- **BKMA-7010 Installation Manual (Supplied with BKMA-7010)**
  This manual describes information regarding the installation of the optional board BKMA-7010.

- **BKMA-7020/7050 Installation Manual (Supplied with BKMA-7020)**
  This manual describes information regarding the installation of the optional board BKMA-7020 and BKMA-7050.

- **BKMA-7030/7060 Installation Manual (Supplied with BKMA-7030)**
  This manual describes information regarding the installation of the optional board BKMA-7030 and BKMA-7060.

- **BKMA-7040 Installation Manual (Supplied with BKMA-7040)**
  This manual describes information regarding the installation of the optional board BKMA-7040.

Trademarks

- Ethernet is a registered trademark of Xerox Corporation.
- Windows is a registered trademark of Microsoft Corporation.
- IBM is a registered trademark of International Business Machine Inc.

Section 1
Diagnostics

1-1. Factory-Setting Menu

This section describes the factory-setting menu. The factory-setting menu contains the items below.
- LCD pixel check screen
- HDD aging screen

LCD pixel check

1. Turn on the power while pressing and holding the [↑] and [↓] buttons.

```
>Cancel  ** Caution! PRODUCTION MENU **
  Black       This Menu is intended for
  Aging       manufacuturling use only.
```

2. Select “Black” using [↑] and [↓] buttons and press the [ENTER] button.
   All pixels on the LCD display then light.

3. After about ten seconds, the current screen automatically returns to the previous screen.

Note

The current screen also returns to the previous screen using a [ENTER] button.

HDD aging

Notes
- The data recorded in HDD is erased when aging is performed.
- Normal operation may not be able to be carried out during aging.

1. Turn on the power while pressing and holding the [↑] and [↓] buttons.

```
>Cancel  ** Caution! PRODUCTION MENU **
  Black       This Menu is intended for
  Aging       manufacuturling use only.
```

2. Select “Aging” using [↑] and [↓] buttons and press the [ENTER] button.

```
  Exit        Drive Aging Check
>Times        set times [10]
  Start   -1-   -2-   -3-   -4-   -5-   -6-   -7-   -8-
  Abort  Rdy   Rdy   Rdy   Rdy   Rdy   Rdy   Rdy   Rdy
```

3. Select “Times” using [↑] and [↓] buttons, set the number of aging times using [←] and [→] buttons, and press the [ENTER] button.

```
 Exit      Drive Aging Check
>Times      set times [10]
 Start   -1-  -2-  -3-  -4-  -5-  -6-  -7-  -8-
 Abort  Rdy  Rdy  Rdy  Rdy  Rdy  Rdy  Rdy  Rdy
```

4. Select “Start” using [↑] and [↓] buttons and press the [ENTER] button to start the aging.

Note

The internal temperature of the unit is displayed on the screen.

```
 Exit      Drive Aging Check in Progress
 Times       internal tmp 31.7                000%
>Start    -1-  -2-  -3-  -4-  -5-  -6-  -7-  -8-
 Abort    Rdy  Rdy  Rdy  Rdy  Rdy  Rdy  Rdy  Rdy
```

5. After operation is completed normally, the message below is displayed.

```
 Exit      Drive Aging Check                Passed
 Times       internal tmp 31.7                100%
>Start    -1-  -2-  -3-  -4-  -5-  -6-  -7-  -8-
 Abort    OK  OK  OK  OK  OK  OK  OK  OK
```

Note

If aging fails, the corresponding HDD is displayed as “NG”.

```
 Exit      Drive Aging Check                Rejected
 Times       internal tmp 31.7                030%
>Start    -1-  -2-  -3-  -4-  -5-  -6-  -7-  -8-
 Abort    OK  OK  NG  Rdy  Rdy  Rdy  Rdy  Rdy
```

Note

To cancel the aging, select “Abort” using [↑] and [↓] buttons and press the [ENTER] button. To restart it, select “Start” and press the [ENTER] button.

6. After aging is completed, turn off the power once.

1-2. RS-232C Connection

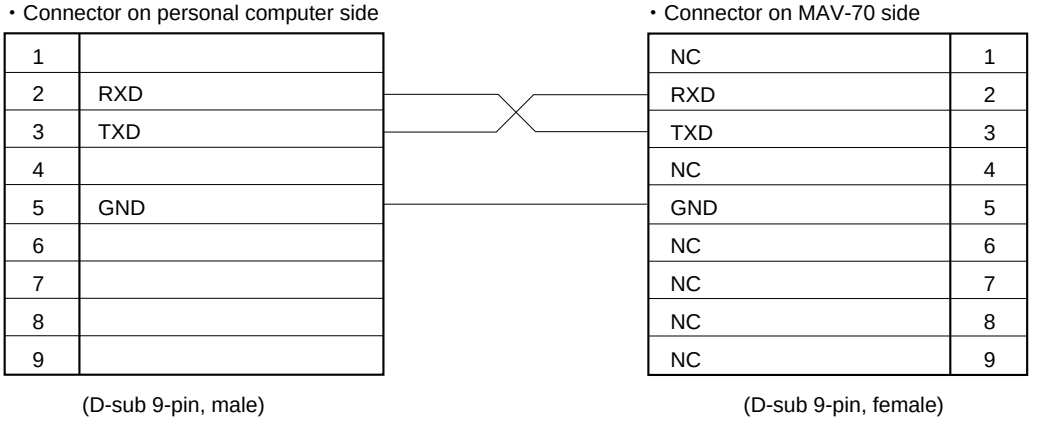
Tool

Tera Term program (with macro function) is available for processing in Section 1-4 to 1-8.

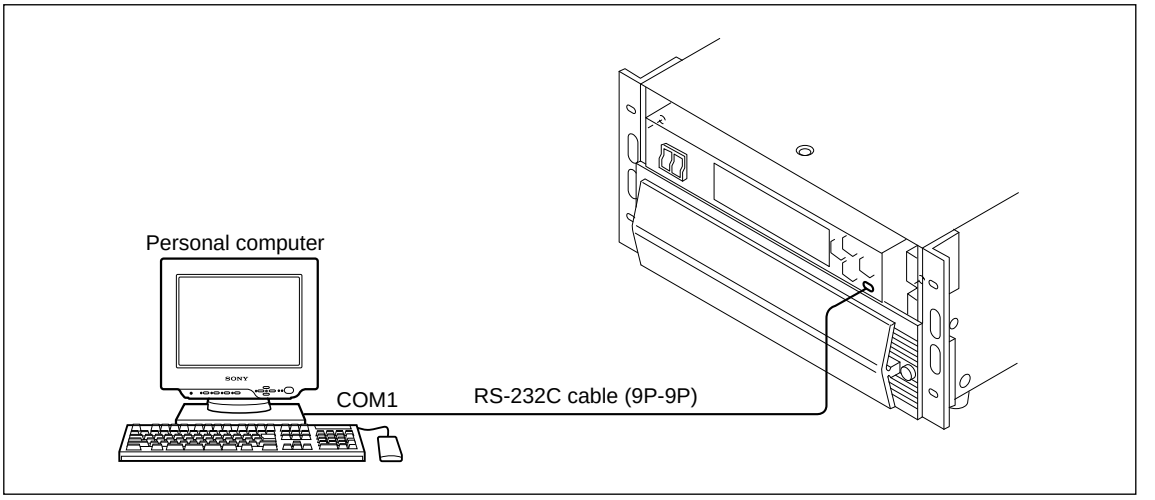
Name	Part number
MAV-70 Upgrade Program	J-6450-330-A

Cable

Personal computer side
D-sub 9-pin, Male 1-560-651-00 (Connector)
1-561-749-00 (Juncton shell)
MAV-70 side
D-sub 9-pin, Female 1-562-565-00 (Connector)
1-561-749-00 (Juncton shell)



Connection



Setting of communication protocol

Communication port	COM1
Baud rate	38400 bps
Parity	None
Flow control	None
Stop bit length	1 bit
Data bit length	8 bit

1-3. Uploading and Downloading the Contents of Memory

This section describes how to upload and download the contents of memories (IC406, IC407, IC414, IC415, IC421, IC422, IC432 and IC433) on the SY-253 board.

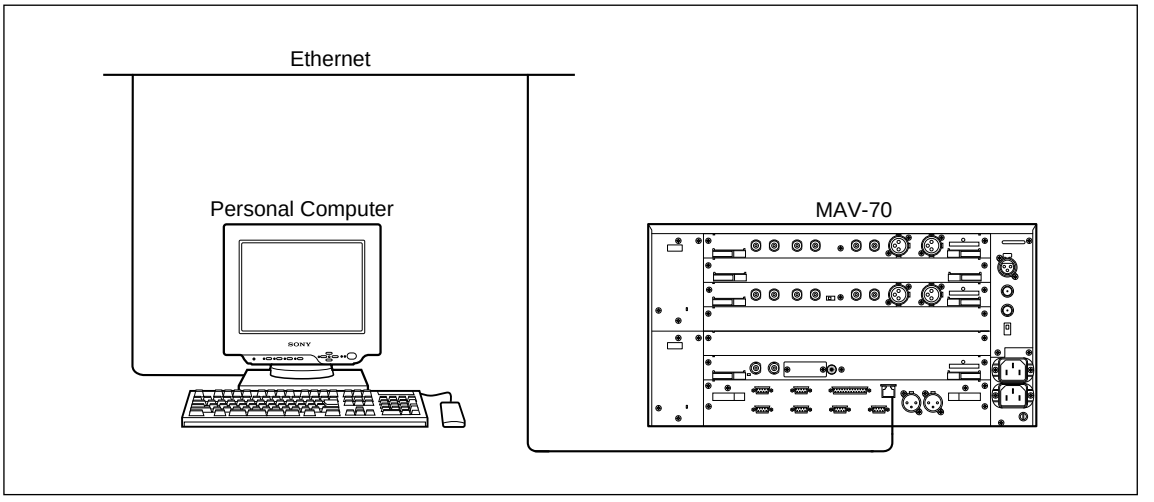
Note

For the display example in using a personal computer, this manual differentiates between the characters displayed on the screen and the characters to be entered as shown below.

Font and style of letters	Display example	Reference for distinction
Times font	UTY>	Automatically displayed message by a program
Helvetica regular (Italic)	*SDC-UTY*	Characters to be entered
Symbols	↵	Enter key
	␣	Space equivalent to a character

Connection

The MAV-70 and personal computer are connected via Ethernet.



Uploading (example)

Note

The displays shown below are samples for your reference.

1. Log in the MAV-70 from personal computer. (Enter the IP address of the MAV-70.)

```
C : ¥> ftp␣xx.xx.xx.xx↵ ←——— IP address
Connected to xx.xx.xx.xx
220 FTP server ready.
```

2. Enter the predetermined user ID and password.

```
User (xx.xx.xx.xx) : wing↵
331 Password required.
Password : mpegworld↵
230 User name accepted.
```

3. Transfer a file from the MAV-70 to current directory of personal computer.

```
ftp> get␣_FS↵
200 OK.
150 ready to send file.
226 closing.
4194304 bytes received in 17.02 seconds
(246.43 Kbytes/ sec)
```

4. Log out.

```
ftp> quit↵
221 Goodbye.
```

Downloading (example)

Note

The displays shown below are samples for your reference.

1. Log in the MAV-70 from personal computer. (Enter the IP address of the MAV-70.)

```
C : ¥> ftp␣xx.xx.xx.xx↵
Connected to xx.xx.xx.xx
220 FTP server ready.
```

2. Enter the predetermined user ID and password.

```
User (xx.xx.xx.xx) : wing↵
331 Password required.
Password : mpegworld↵
230 User name accepted.
```

3. Transfer a file from current directory of personal computer to the MAV-70.

```
ftp> put␣_FS↵
200 OK.
150 ready to take file.
226 closing.
4194304 bytes sent in 17.02 seconds
(246.43 Kbytes/ sec)
```

4. Log out.

```
ftp> quit↵
221 Goodbye.
```

1-4. Uploading and Downloading the Contents of Memory (PU-102 Board)

This section describes how to upload and download the contents of memory (IC301) on the PU-102 board using a macro function of Tera Term.

Preparation

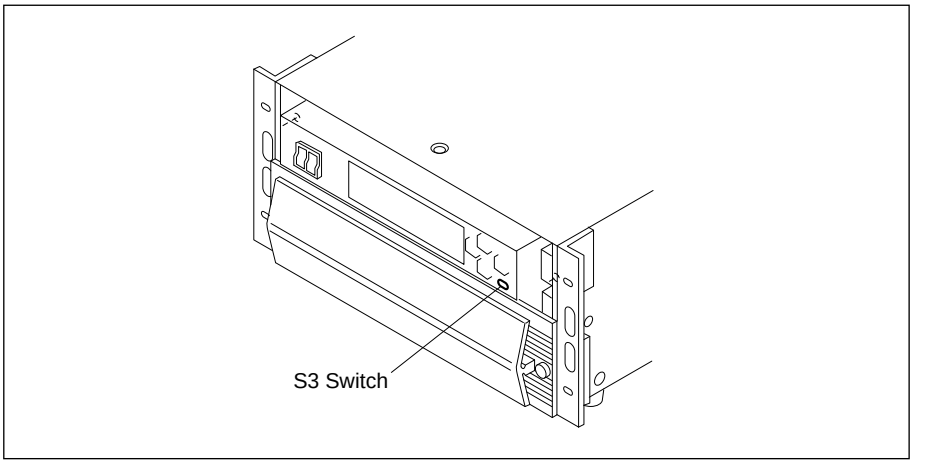
1. Remove ornamental panel A. (Refer to Section 2-2-1.)
2. Open “Service: Board Slot n” screen from the menu.
   (For more details of the operation, refer to the Operation Manual.)

```
  Exit        Service : Board Slot 1 ENC
>Param          |
  EXT232C  -1-   -2-   -3-   -4-   -5-   -6-   -7-   -8-
           Rdy   Rdy   Rdy   Rdy   Rdy   Rdy   Rdy   Rdy
```

3. Select “EXT232C” using the [↑] and [↓] buttons and then select “- 8 -” (PU-102 board) using the [←] and [→] buttons.
4. Press the [ENTER] button.

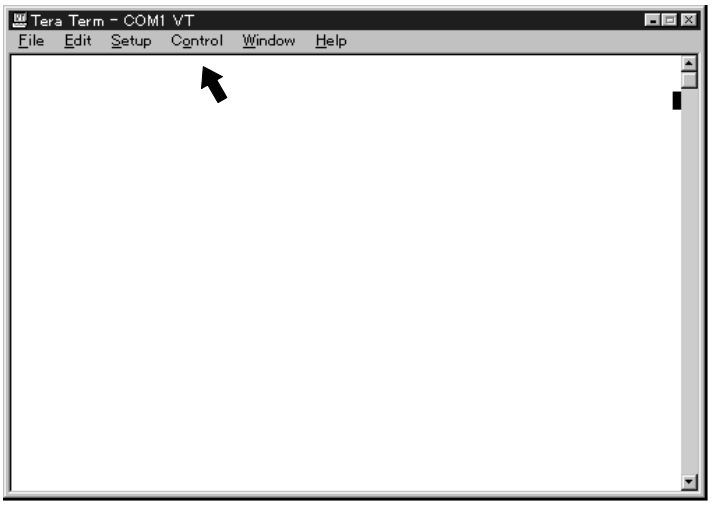
```
  Exit        Service : Board Slot 8 PU
>Param                                              |
  EXT232C  -1-   -2-   -3-   -4-   -5-   -6-   -7-   *8*
           Rdy   Rdy   Rdy   Rdy   Rdy   Rdy   Rdy   Rdy
```

5. Connect the MAV-70 to a personal computer and set the communication rate. (Refer to Section 1-2.)
6. Set the S3 switch on the front panel to INT.

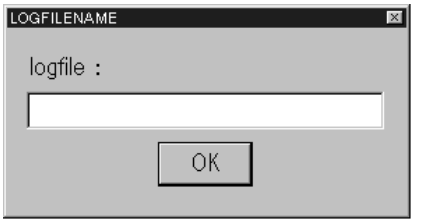


Uploading

1. Activate Tera Term.
2. Select “Control” – “Macro” from the top menu.



3. Activate a “Puget**.ttl” file.
4. Enter the file name.
   (Example : “pudata.log”)



5. A confirmation message is displayed. The screen display stops when uploading is completed. Click the [OK] button.

6. Terminate Tera Term.

Downloading

Note

The error information of HDD has been written in this memory. This unit may not normally operate when incorrect data is downloaded.

1. Activate Tera Term.
2. Select “Control” – “Macro” from the top menu.
3. Activate a “Puput**.ttl” file.
4. Enter the file name.
5. A confirmation message is displayed. The screen display stops when downloading is completed. Click the [OK] button.
6. Terminate Tera Term.

1-5. Acquiring the Log

This section describes how to acquire the log using a macro function of Tera Term.

Note

Be sure to put the boards into the STOP state before acquiring the log on the ENC and DEC boards.

Preparation (For except DP-269 board)

1. Remove ornamental panel A. (Refer to Section 2-2-1)
2. Open “Service: Board Slot n” screen from the menu.
   (For more details of the operation, refer to the Operation Manual.)

```
  Exit        Service : Board Slot 1 ENC
>Param          |
  EXT232C  -1-   -2-   -3-   -4-   -5-   -6-   -7-   -8-
           Rdy   Rdy   Rdy   Rdy   Rdy   Rdy   Rdy   Rdy
```

3. Select “EXT232C” using the [↑] and [↓] buttons and then select the board (slot No.) to be treated using the [←] and [→] buttons. Press the [ENTER] button.

   Note

   For SY-253 board, press the [ENTER] button several times and select the CPU to be used.

```
  Exit        Service : Board Slot 7 SY DPC
>Param                                      |
  EXT232C  -1-   -2-   -3-   -4-   -5-   -6-   *7*   -8-
           Rdy   Rdy   Rdy   Rdy   Rdy   Rdy   Rdy   Rdy
```

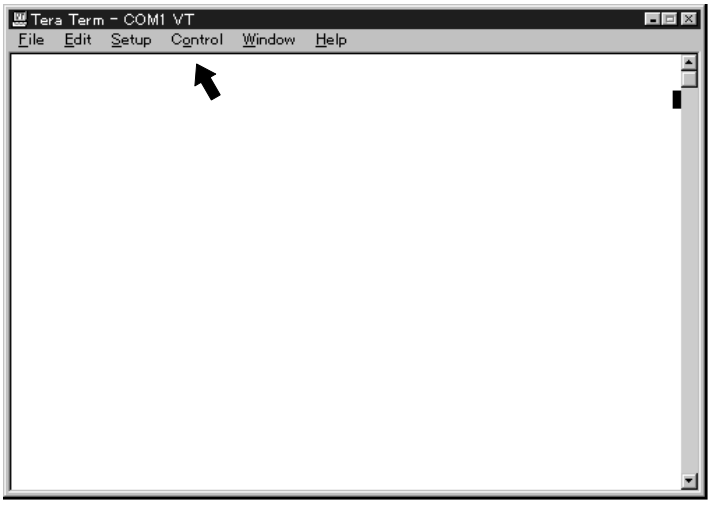
4. Connect the MAV-70 to a personal computer and set the communication rate. (Refer to Section 1-2.)
5. Set the S3 switch on the front panel to INT.

Preparation (For DP-269 board)

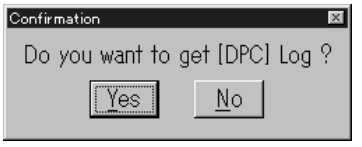
1. Remove ornamental panel A. (Refer to Section 2-2-1.)
2. Connect the MAV-70 to a personal computer and set the communication rate. (Refer to Section 1-2.)
3. Set the S3 switch on the front panel to EXT.

Procedure

1. Activate Tera Term.
2. Select “Control” – “Macro” from the top menu.



3. Activate a “GetLog**.ttl” file.
4. A confirmation message is displayed. Click the [Yes] button.
   (The screen image is an example of DPC CPU.)



5. A confirmation message is displayed. Click the [OK] button.

6. A termination message is displayed. Click the [OK] button.

7. Terminate Tera Term.

1-6. Upgrading the ROM on Board

This section described how to update the ROM on the board using a macro function of Tera Term.
The ROM to be upgraded is as shown below.

CPU name	Board	Ref.	File name
MAIN	SY-253	IC327, 340	SYM∗∗∗.mot
DPC	SY-253		SYD∗∗∗.mot
FSE	SY-253		SYF∗∗∗.mot
CCM	SY-253		SYC∗∗∗.mot
DP	DP-269		DP∗∗∗.mot
PU	PU-102	IC107, 112	PU∗∗∗.mot
ENDEC	ENC-51 (BKMA-7010)	IC1306	ED∗∗∗.mot
ENC	ENC-47 (BKMA-7020)	IC1306	ENC∗∗∗.mot
DEC	DEC-98 (BKMA-7030)	IC1107	DEC∗∗∗.mot
FC	IF-677 (BKMA-7040)	IC104, 105	FC∗∗∗.mot

Note

When downloading DPC CPU (SY-253 board) of a loop-connected extension unit, open “Service: Config” screen from the menu of the extension unit and set “Single”.
After upgrading is completed, return the menu to the former setting.

Preparation (For except DP-269 board)

1. Remove ornamental panel A. (Refer to Section 2-2-1.)
2. Open “Service: Board Slot n” screen from the menu.
   (For more details of the operation, refer to the Operation Manual.)

```
  Exit        Service : Board Slot 1 ENC
>Param          |
  EXT232C  -1-   -2-   -3-   -4-   -5-   -6-   -7-   -8-
           Rdy   Rdy   Rdy   Rdy   Rdy   Rdy   Rdy   Rdy
```

3. Select “EXT232C” using the [↑] and [↓] buttons and then select the board to be treated (slot No.) using the [←] and [→] buttons. Press the [ENTER] button.

   Note

   For SY-253 board, press the [ENTER] button several times and select the CPU to be used.

```
  Exit        Service : Board Slot 4 DEC
>Param                          |
  EXT232C  -1-   -2-   -3-   ∗4∗   -5-   -6-   -7-   -8-
           Rdy   Rdy   Rdy   Rdy   Rdy   Rdy   Rdy   Rdy
```

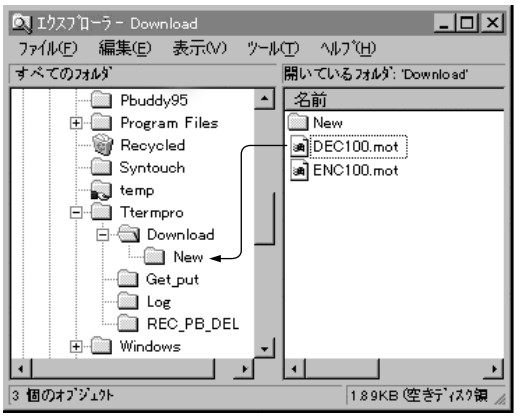
4. Connect the MAV-70 to a personal computer and set the communication rate. (Refer to Section 1-2.)
5. Set the S3 switch on the front panel to INT.

Preparation (For DP-269 board)

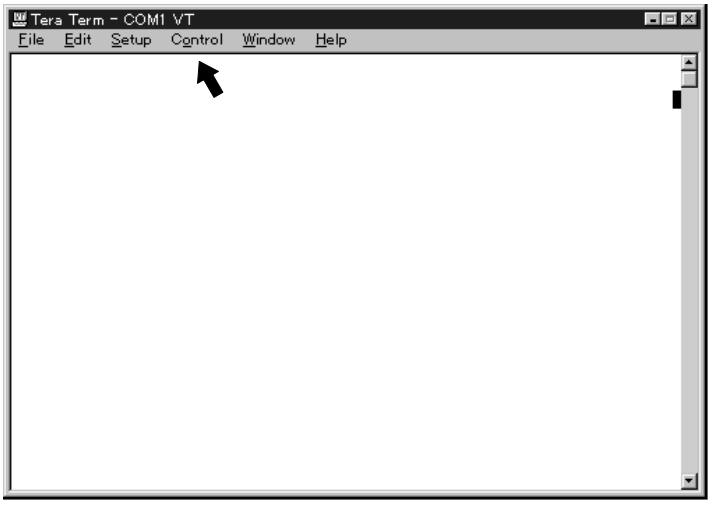
1. Remove ornamental panel A. (Refer to Section 2-2-1.)
2. Connect the MAV-70 to a personal computer and set the communication rate. (Refer to Section 1-2.)
3. Set the S3 switch on the front panel to EXT.

Procedure

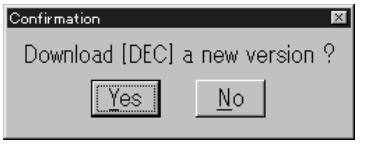
1. Move the upgrading data file (******.mot) to the “New” holder in the “Download” holder.



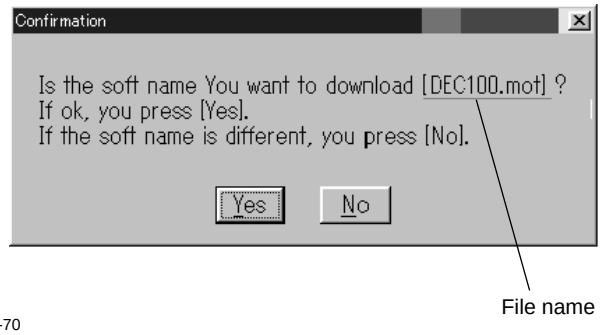
2. Activate Tera Term.
3. Select “Control” - “Macro” from the top menu.



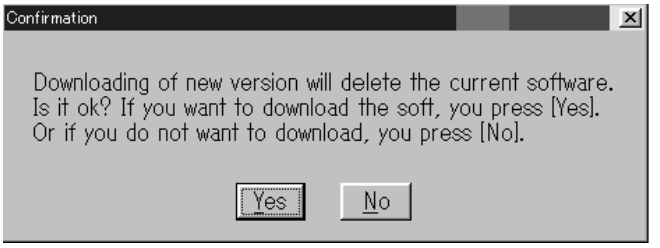
4. Activate a “DL**.ttl” file.
5. A confirmation message is displayed. Click the [Yes] button.
   (The screen image is an example of DEC CPU.)



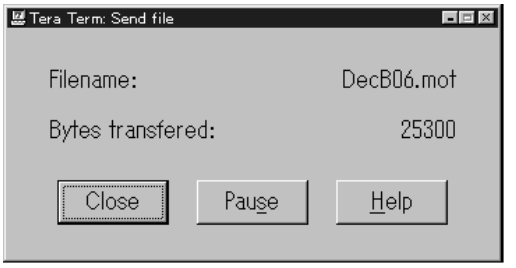
6. Confirm the file name to be downloaded.


Confirmation
Is the soft name You want to download [DEC100.mot] ?
If ok, you press [Yes].
If the soft name is different, you press [No].
Yes
No
File name

7. A confirmation message is displayed. Click the [Yes] button.


Confirmation
Downloading of new version will delete the current software.
Is it ok? If you want to download the soft, you press [Yes].
Or if you do not want to download, you press [No].
Yes
No

8. Downloading is executed.

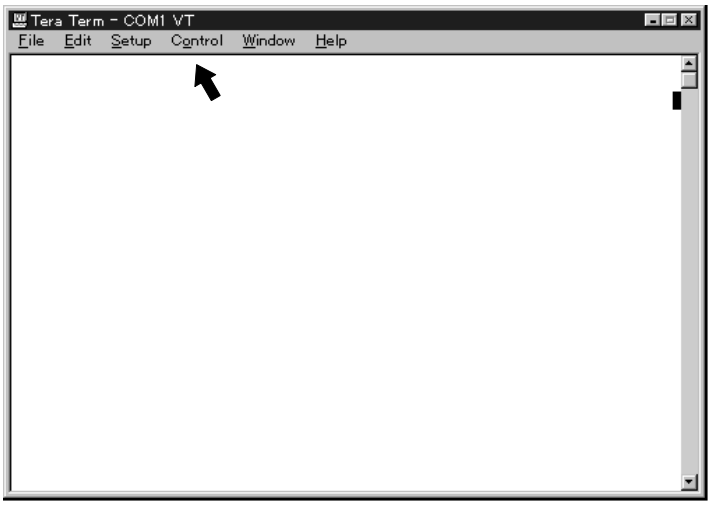


9. After downloading is completed, this window disappears.
10. A confirmation message is displayed. The screen display stops. Click the [OK] button.

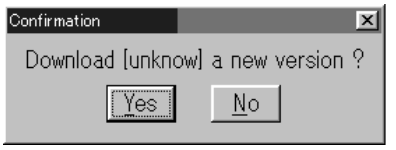
11. Terminate Tera Term.

Measures to be taken during abnormal termination

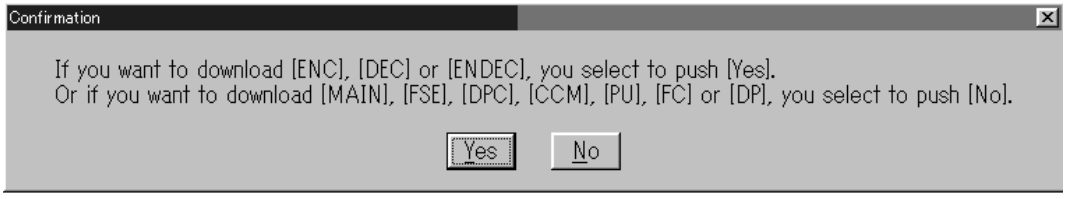
1. Select “Control” – “Macro” from the top menu.



2. Activate a “DL**.ttl” file.
3. A confirmation message is displayed. Click the [Yes] button.

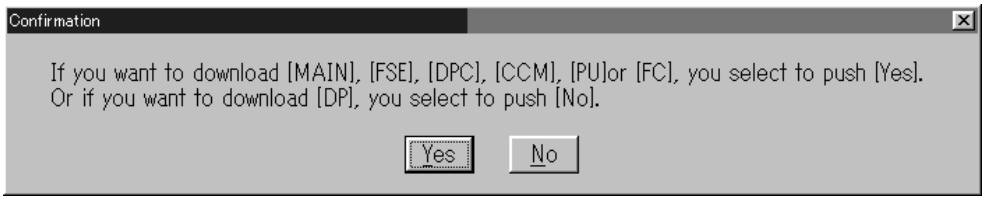


4. A confirmation message is displayed. If the board to be treated is ENC, DEC, and ENDEC, click the [Yes] button. If the board to be treated is except described above, click the [No] button.


Confirmation
If you want to download [ENC], [DEC] or [ENDEC], you select to push [Yes].
Or if you want to download [MAIN], [FSE], [DPC], [CCM], [PU], [FC] or [DP], you select to push [No].
Yes
No

Note

When click the “No” button, a confirmation message is displayed. If the board to be treated is DP, click the [No] button. If the board to be treated is except DP, click the [Yes] button.


Confirmation
If you want to download [MAIN], [FSE], [DPC], [CCM], [PU]or [FC], you select to push [Yes].
Or if you want to download [DP], you select to push [No].
Yes
No

5. Downloading is executed.

1-7. Upgrading the ROM on Board (When no macro function is used)

This section describes to upgrade the ROM on the board by entering commands.
Follow this procedure if the upgrading (in Section 1-6) cannot be performed using a macro function.

1-7-1. Preparation before Adjustment

Note

When upgrading DPC CPU (SY-253 board) of a loop-connected extension unit, open “Service: Config” screen from the menu of the extension unit and set “Single”.
After upgrading is completed, return the menu to the former setting.

Preparation

1. Perform in the same procedure as for preparation in Section 1-6.
2. Activate Tera Term, select “Control” – “Macro” from the top menu, set the following item.
   Transmit delay : 0 msec/char
   0 msec/line

1-7-2. ENDEC CPU (BKMA-7010), ENC CPU (BKMA-7020), and DEC CPU (BKMA-7030)

Note

The display screen is an example of DEC CPU.

1. Activate Tera Term.
2. Press the [ENTER] key.
   (“MON>” is displayed.)

```
↵
MON>
```

3. Enter “VER” and confirm the CPU name and current software version.

```
MON> VER↵
[DEC] Version : 1.000, Nov 18 1998
Compiled at 10 : 12 : 31
MON>
```

4. Enter “FLASH ERASE 1”.
   (Software sector 1 in the old version is erased.)

```
MON> FLASH␣ERASE␣1↵
FLASH ERASE ERASE 1 . . . OK
MON>
```

5. Enter “RES”.
   (The program in the old version stops and the CPU is reset.)

```
MON> RES↵
*** MONGER (MONitor/debugGER) Version 0.32 Copylight (C) 1993-96 Sony Corp. ***
(Nov 7 1996/16:42:56)
[RES]
```

6. Enter “FLASH ERASE USER”.
   (The software in the old version is erased.)

```
FLASH␣ERASE USER↵
 FLASH ERASE USER
Erase Sector 1 . . . OK
Erase Sector 2 . . . OK
Erase Sector 3 . . . OK
Erase Sector 4 . . . OK
Erase Sector 5 . . . OK
Erase Sector 6 . . . OK
Erase Sector 7 . . . OK

MON>
```

7. Enter “FL”.
   (“Load Mode” is displayed.)

```
MON> FL↵
Load Mode
```

8. Select “File” – “Sendfile” from the top menu.
9. Select the file to be downloaded.
   ED CPU: “ED∗∗∗.mot”
   ENC CPU: “ENC∗∗∗.mot”
   DEC CPU: DEC∗∗∗.mot”
10. Downloading is executed.

CAUTION

Never touch the screen until downloading is completed. If downloading is interrupted because of touching the screen, repeat steps 4 and later.

11. After downloading is completed, “OK” is displayed.

```
Load ModeOK
MON>
```

12. Enter “RES” and confirm that a message is displayed on the screen.
    (The program in a new version is executed.)

```
MON> RES↵
∗∗∗ MONGER (MONitor/debugGER) Version 0.32 Copylight (C) 1993-96 Sony Corp. ∗∗∗
(Nov 7 1996/16:42:56)
[RES]

∗∗∗ MONGER (MONitor/debugGER) Version 0.32.2 Copylight (C) 1993-96 Sony Corp. ∗∗∗
(Oct 21 1998/15:43:16)
[Undefined]
      :
```

1-7-3. FC CPU (BKMA-7040)

1. Activate Tera Term.
2. Press the [ENTER] key.
   ("MON>" is displayed.)
3. Enter "VER" and confirm the CPU name and current software version.
4. Enter "FLASH ERASE USER".
   (The software in the old version is erased and the CPU is reset automatically.)
5. Enter "FL".
   ("Load Mode" is displayed.)
6. Select "File" – "Sendfile" from the top menu.
7. Select the file ("FC∗∗∗.mot") to be downloaded.
8. Downloading is executed.
   CAUTION
   Never touch the screen until downloading is completed. If downloading is interrupted because of touching the screen, repeat steps 4 and later.

9. After downloading is completed, "OK" is displayed.
10. Enter "RES" and confirm that a message is displayed on the screen.
    (The program in a new version is executed.)

1-7-4. PU CPU

1. Activate Tera Term.
2. Press the [ENTER] key.
   ("PU>" is displayed.)
3. Enter "VER" and confirm the CPU name and current software version.
4. Enter "FLASH ERASE USER".
   (The software in the old version is erased.)
5. Enter "RES".
   (The software in the old version is erased and the CPU is reset automatically.)
7. Enter "FL".
   ("Load Mode" is displayed.)
8. Select "File" – "Sendfile" from the top menu.
9. Select the file ("PU∗∗∗.mot") to be downloaded.
10. Downloading is executed.
    CAUTION
    Never touch the screen until downloading is completed. If downloading is interrupted because of touching the screen, repeat steps 4 and later.

11. After downloading is completed, "OK" is displayed.
12. Enter "RES" and confirm that a message is displayed on the screen.
    (The program in a new version is executed.)

1-7-5. MAIN CPU, DPC CPU

1. Activate Tera Term.
2. Press the [ENTER] key.
   ("MON>" is displayed.)
3. Enter "VER" and confirm the CPU name and current software version.
4. Enter "FLASH ERASE USER".
   (The software in the old version is erased and the CPU is reset automatically.)
5. Enter "FL".
   ("Load Mode" is displayed.)
6. Select "File" – "Sendfile" from the top menu.
7. Select the file to be downloaded.
   MAIN CPU : "SYM***.mot"
   DPC CPU : "DPC***.mot"
8. Downloading is executed.
   CAUTION
   Never touch the screen until downloading is completed. If downloading is interrupted because of touching the screen, repeat steps 4 and later.

9. After downloading is completed, "OK" is displayed.
10. Enter "RES" and confirm that a message is displayed on the screen.
    (The program in a new version is executed.)

1-7-6. CCM CPU

1. Activate Tera Term.
2. Press the [ENTER] key.
   ("MON>" is displayed.)
3. Enter "VER" and confirm the CPU name and current software version.
4. Enter "FLASH ERASE USER".
   (The software in the old version is erased and the CPU is reset automatically.)
5. Enter "FL".
   ("Load Mode" is displayed.)
6. Select "File" – "Sendfile" from the top menu.
7. Select the file ("CCM***.mot") to be downloaded.
8. Downloading is executed.
   CAUTION
   Never touch the screen until downloading is completed. If downloading is interrupted because of touching the screen, repeat steps 4 and later.

9. After downloading is completed, "OK" is displayed.
10. Enter "RES" and confirm that a message is displayed on the screen.
    (The program in a new version is executed.)

1-7-7. FSE CPU

1. Activate Tera Term.
2. Press the [ENTER] key.
   ("FSE>" is displayed.)
3. Enter "VER" and confirm the CPU name and current software version.
4. Enter "q".
   ("MON>" is displayed.)
5. Enter "FLASH ERASE USER".
   (The software in the old version is erased and the CPU is reset automatically.)
6. Enter "FL".
   ("Load Mode" is displayed.)
7. Select "File" – "Sendfile" from the top menu.
8. Select the file ("FSE∗∗∗.mot") to be downloaded.
9. Downloading is executed.

   CAUTION

   Never touch the screen until downloading is completed. If downloading is interrupted because of touching the screen, repeat steps 5 and later.

10. After downloading is completed, "OK" is displayed.
11. Enter "RES" and confirm that a message is displayed on the screen.
    (The program in a new version is executed.)
    ("FSE>" is displayed.)

1-7-8. DP CPU

Note

Make preparations (for DP-269 board) while referring to Section 1-6.

1. Activate Tera Term.
2. Press the [ENTER] key.
   ("MON>" is displayed.)
3. Enter "VER" and confirm the CPU name and current software version.
4. Enter "FLASH ERASE USER".
   (The software in the old version is erased and the CPU is reset automatically.)
5. Enter "FL".
   ("Load Mode" is displayed.)
6. Select "File" – "Sendfile" from the top menu.
7. Select the file ("CCM∗∗∗.mot") to be downloaded.
8. Downloading is executed.

   CAUTION

   Never touch the screen until downloading is completed. If downloading is interrupted because of touching the screen, repeat steps 4 and later.

9. After downloading is completed, "OK" is displayed.
10. Enter "RES" and confirm that a message is displayed on the screen.
    (The program in a new version is executed.)
    ("DP>" is displayed.)

1-8. Upgrading the BOOT OS

This section describes how to upgrade the BOOT OS by entering commands.

1-8-1. FSE BOOT OS

1. S301-1/SY-253 board → OFF
2. Remove ornamental panel A. (Refer to Section 2-2-1.)
3. Turn on the power.
4. Connect the MAV-70 to a personal computer and set the communication rate. (Refer to Section 1-2.)
5. Open “Service: Board Slot n” screen from the menu and set “EXT232C” and “SY MAIN”.
6. Activate Tera Term.
7. Press the [ENTER] key.
   (“MON>” is displayed.)
8. Enter “FLASH 1 ERASE BOOT”
   (The software in the old version is erased.)
9. Enter “FL 1”.
   (“Load Mode” is displayed.)
10. Select “File” – “Sendfile” from the top menu.
11. Select the file (“bmon1.mot”) to be downloaded.
12. Downloading is executed.
    CAUTION
    Never touch the screen until downloading is completed. If downloading is interrupted because of touching the screen, repeat steps 8 and later.

13. After downloading is completed, “OK” is displayed.
14. Enter “RES” and confirm that a message is displayed on the screen.
    (The program in a new version is executed.)
15. Turn off the power.
16. S301-1/SY-253 board → ON
17. Turn on the power.
18. Open “Service: Board Slot n” screen from the menu and set “EXT232C” and “SY FSE”.
19. Activate Tera Term.
20. Press the [ENTER] key.
    (“FSE>” is displayed.)
21. Enter “q”.
    (“MON>” is displayed.)
22. Enter “RES” and confirm that a message is displayed on the screen.
    (The program in a new version is executed.)

1-8-2. DPC BOOT OS

Note

When upgrading DPC BOOT OS of a loop-connected extension unit, open “Service: Config” screen from the menu of the extension unit and set “Single”.
After upgrading is completed, return the menu to the former setting.

1. S301-1/SY-253 board → OFF
2. Remove ornamental panel A. (Refer to Section 2-2-1.)
3. Turn on the power.
4. Connect the MAV-70 to a personal computer and set the communication rate. (Refer to Section 1-2.)
5. Open “Service: Board Slot n” screen from the menu and set “EXT232C” and “SY MAIN”.
6. Activate Tera Term.
7. Press the [ENTER] key.
   (“MON>” is displayed.)
8. Enter “FLASH 2 ERASE BOOT”
   (The software in the old version is erased.)
9. Enter “FL 2”.
   (“Load Mode” is displayed.)
10. Select “File” – “Sendfile” from the top menu.
11. Select the file (“bmon2.mot”) to be downloaded.
    Note
    The file downloaded using DPC BOOT OS is the same as one downloaded using CCM boot OS.

12. Downloading is executed.
    CAUTION
    Never touch the screen until downloading is completed. If downloading is interrupted because of touching the screen, repeat steps 8 and later.

13. After downloading is completed, “OK” is displayed.
14. Enter “RES” and confirm that a message is displayed on the screen.
    (The program in a new version is executed.)
15. Turn off the power.
16. S301-1/SY-253 board → ON
17. Turn on the power.
18. Open “Service: Board Slot n” screen from the menu and set “EXT232C” and “SY DPC”.
19. Activate Tera Term.
20. Press the [ENTER] key.
    (“MON>” is displayed.)
21. Enter “RES” and confirm that a message is displayed on the screen.
    (The program in a new version is executed.)

1-8-3. CCM BOOT OS

1. S301-1/SY-253 board → OFF
2. Remove ornamental panel A. (Refer to Section 2-2-1.)
3. Turn on the power.
4. Connect the MAV-70 to a personal computer and set the communication rate. (Refer to Section 1-2.)
5. Open “Service: Board Slot n” screen from the menu and set “EXT232C” and “SY MAIN”.
6. Activate Tera Term.
7. Press the [ENTER] key.
   (“MON>” is displayed.)
8. Enter “FLASH 3 ERASE BOOT”
   (The software in the old version is erased.)
9. Enter “FL 3”.
   (“Load Mode” is displayed.)
10. Select “File” – “Sendfile” from the top menu.
11. Select the file (“bmon2.mot”) to be downloaded.
    Note
    The file downloaded using DPC BOOT OS is the same as one downloaded using CCM BOOT OS.

12. Downloading is executed.
    CAUTION
    Never touch the screen until downloading is completed. If downloading is interrupted because of touching the screen, repeat steps 8 and later.

13. After downloading is completed, “OK” is displayed.
14. Enter “RES” and confirm that a message is displayed on the screen.
    (The program in a new version is executed.)
15. Turn off the power.
16. S301-1/SY-253 board → ON
17. Turn on the power.
18. Open “Service: Board Slot n” screen from the menu and set “EXT232C” and “SY CCM”.
19. Activate Tera Term.
20. Press the [ENTER] key.
    (“MON>” is displayed.)
21. Enter “RES” and confirm that a message is displayed on the screen.
    (The program in a new version is executed.)

Section 2
Replacement of Main Parts and Boards

2-1. Cautions before Servicing

The hard disk drives (HDD) are installed in the MAV-70.
The HDD is a precision part. The causes such as shock, vibration and static electricity to the unit, and the conditions of temperature and humidity may damage HDD or its data.
Before servicing, read the following cautions carefully, and perform the servicing with extra care.

Cautions about shock and vibration

When transporting and moving:
- Pack the unit using the packaging materials specified by the manufacturer. (When transporting the MAV-70, pack the HDDs separately.)
- Use a proper cart.
- Put a cushion* on the cart.
- Avoid rough routes, and manage the cart gently.

When placing on a floor or table:
- Put a cushion* on stable and horizontal place, and put the MAV-70 on it gently.
- Do not place the unit near vibrating equipment.

For the MAV-70 and HDD:
- Never hit the HDD by a tool, and drop it on the MAV-70.

Take extra care:
- Never give vibration or shock to the HDD during the power on, or within about 30 seconds after turning off the power.
- Be extremely careful when removing and/or installing the HDD unit, fan motor unit or power supply unit while the MAV-70 is in live state.

*Cushion : Polyethylene foam (density : 38 kg/m^3, surface intrinsic resistance : 10^{11} to 10^{12} Ω, thickness : 50 mm) or equivalent.

Cautions about removal/installation of the MAV-70 from rack

- Never give shock to all the rack mounted unit which has a HDD.
- Be sure to turn off the power of the rack mounted unit which has a HDD.

Cautions about static electricity

- Keep static-producing items such as plastics away from the working area.
- When deal with the HDD, must be put on the earth-band to establish a ground.

Cautions about temperature and humidity

- Temperature and humidity of storage and operating conditions must be kept within the correct specified range.
- Never turn on the power with the cabinet is removed in consideration of the air-cooling effect. When turn on the power without installing the cabinet, it is essential that the unit should be covered with the substitute for the cabinet.

Cautions when an error appears in HDD

- Treat the MAV-70 conform to the above cautions, even when an error appeared.
- Keep the MAV-70 in the condition in which the error appeared, and write down the details of the error.

2-2. Removal/Installation of Cabinet

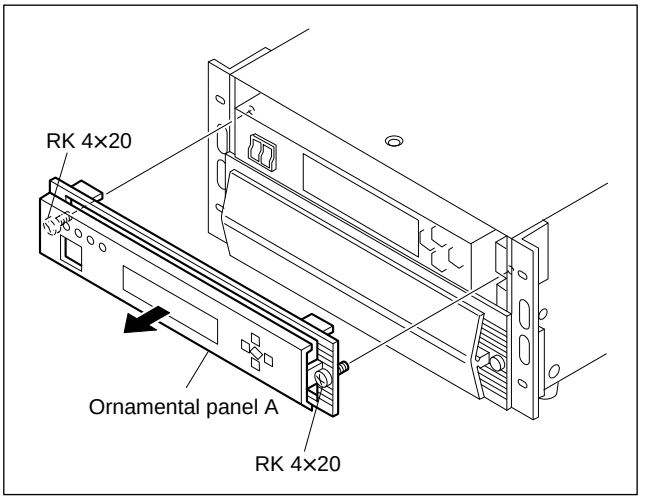
2-2-1. Front Panel Removal/Installation

Note

Be sure to put on the earth-band to establish a ground when removing/installing the ornamental panel A and the front panel (lower) during the power on. If not, this may cause malfunction.

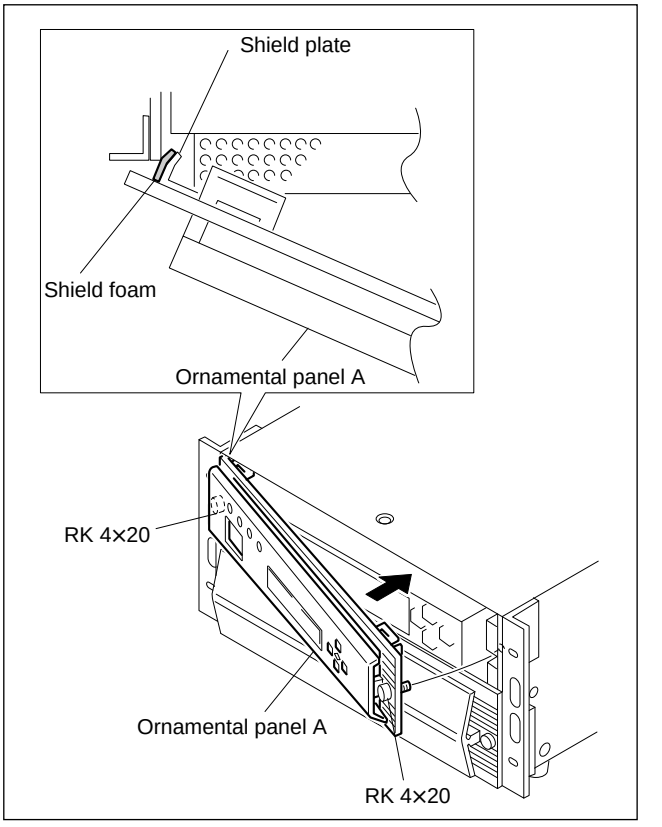
Ornamental Panel A Removal

1. Loosen the two screws (with stoppers) on the ornamental panel A.
2. Remove the ornamental panel A.



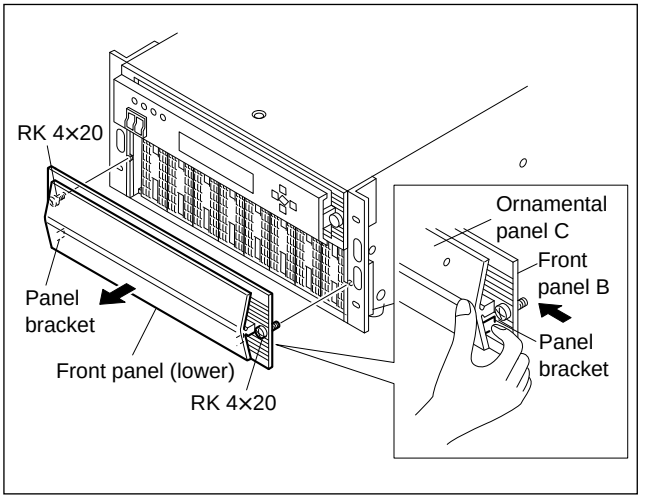
Ornamental Panel A Installation

1. Attach the ornamental panel A to the unit as shown in the figure, and tighten the two screws. At this time, press the shield plate against inside of the unit to avoid the shield foam from peeling off.



Front Panel (Lower) Removal/Installation

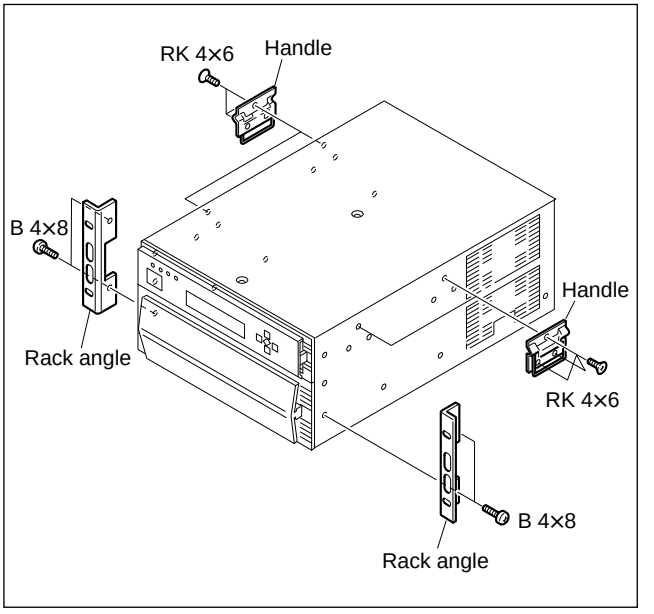
1. Loosen the two screws (with stoppers) on the front panel B.
2. Remove the front panel (lower) while pushing the panel brackets between the ornamental panel C and front panel B.



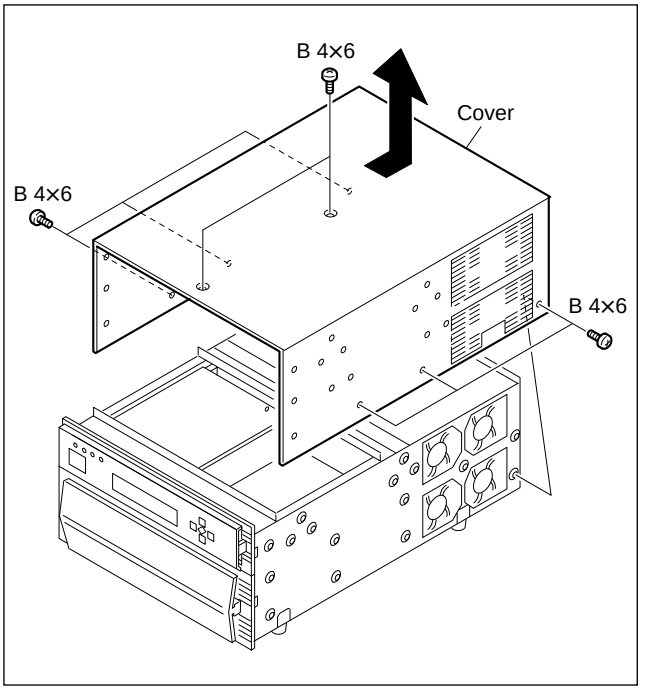
3. For installation, perform the removal procedures in reverse order.

2-2-2. Cover Removal/Installation

1. Remove the four screws, and remove the rack angles of both sides.
2. Remove the twelve screws (three screws for one handle), and remove all handles of both sides.



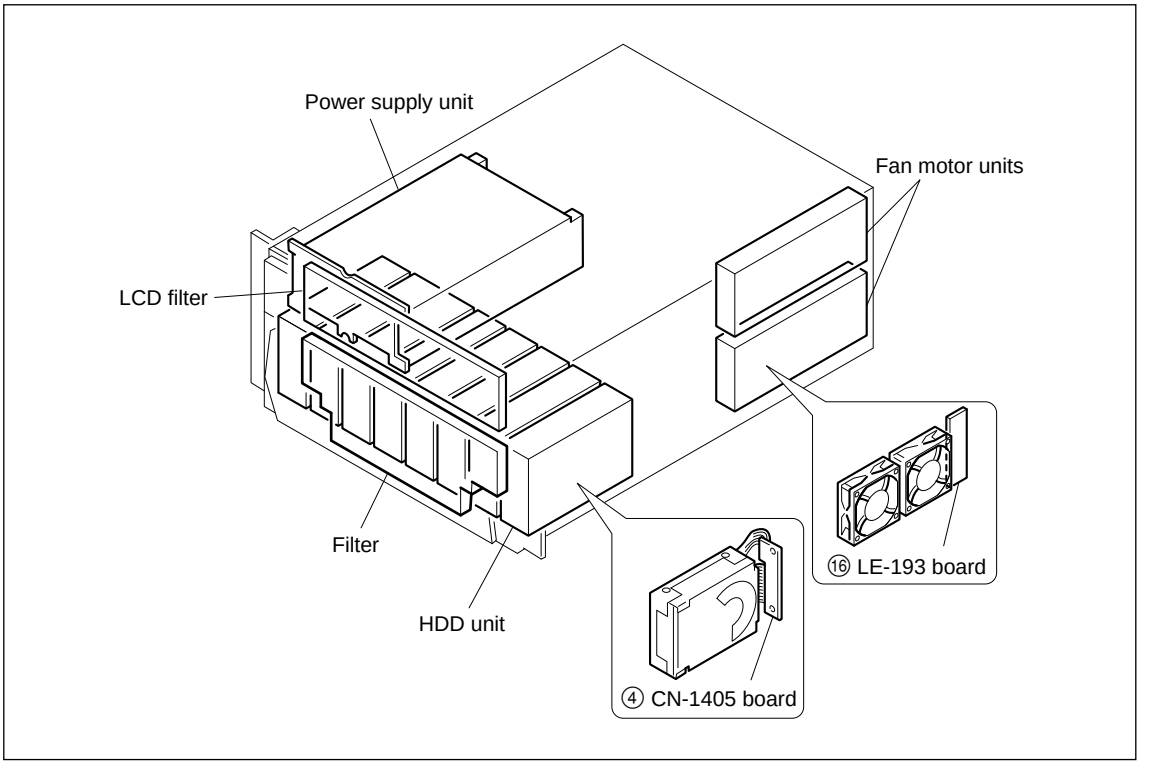
3. Remove the eight screws, and remove the cover while winding both sides of the cover.



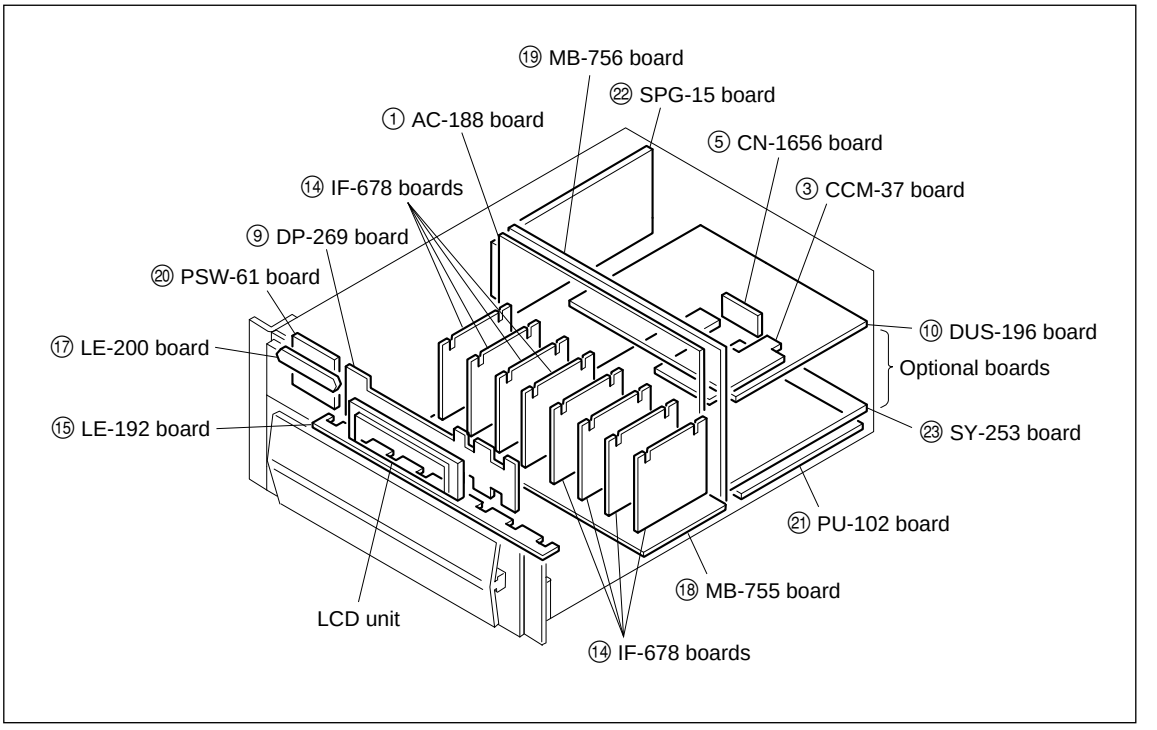
4. For installation, perform the removal procedures in reverse order.

2-3. Location of Main Parts and Boards

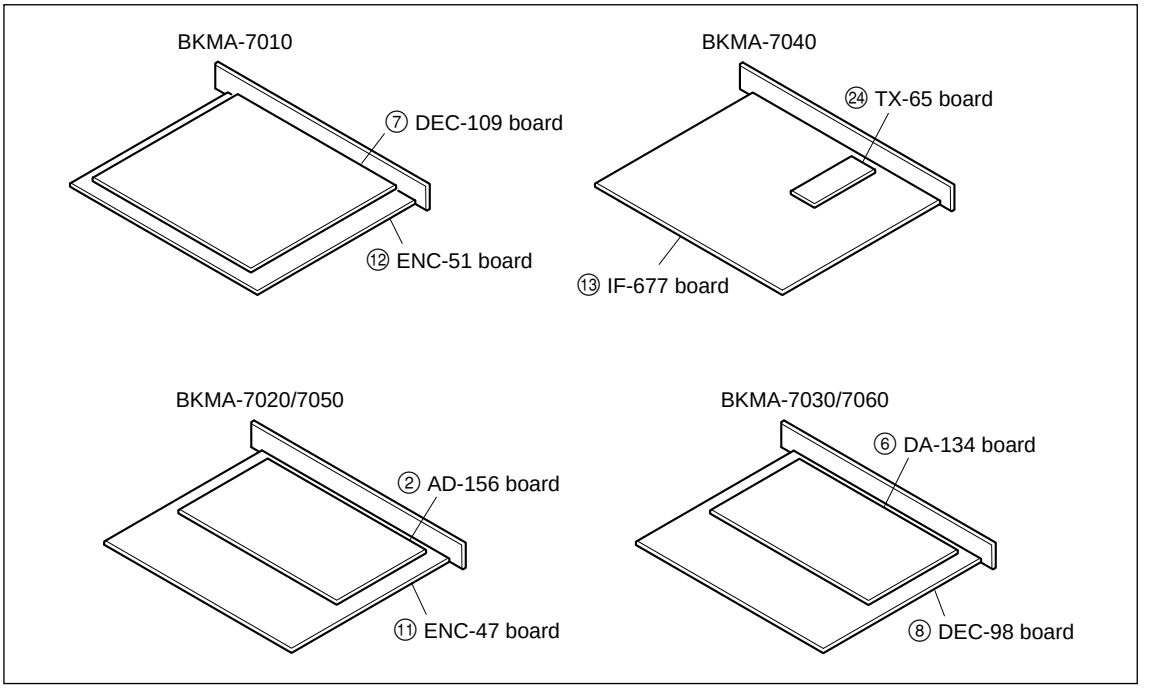
Main Parts Location



Boards Location



Boards (Optional Boards) Location



No.	Board Name	Function
①	AC-188	Power splitting connector
②	AD-156 (BKMA-7050)	Analog audio/analog composite video input
③	CCM-37	Ethernet control
④	CN-1405	HDD connector
⑤	CN-1656	AUDIO MONITOR OUT connector
⑥	DA-134 (BKMA-7060)	Analog audio/analog composite video output
⑦	DEC-109 (BKMA-7010)	Decoder (MPEG to SDI)
⑧	DEC-98 (BKMA-7030)	Decoder (MPEG to SDI)
⑨	DP-269	LCD display/function switch
⑩	DUS-196	Dummy load
⑪	ENC-47 (BKMA-7020)	Encoder (SDI to MPEG)
⑫	ENC-51 (BKMA-7010)	Encoder (SDI to MPEG)
⑬	IF-677 (BKMA-7040)	High-speed interface
⑭	IF-678	HDD interface
⑮	LE-192	HDD access indicator
⑯	LE-193	Fan unit indicator
⑰	LE-200	Power/BUSY indicator
⑱	MB-755	Motherboard for HDD interface
⑲	MB-756	Motherboard
⑳	PSW-61	Power switch
㉑	PU-102	HDD array control
㉒	SPG-15	Sync generator
㉓	SY-253	System control
㉔	TX-65 (BKMA-7040)	Fiber channel transceiver

2-4. Replacement of Main Parts

2-4-1. General Information for Parts Replacement

Periodic Replacement

It is recommended to replace the parts described in the table below periodically.
And, it is recommended to clean the filters periodically.

Part Name	Recommended Replacement Cycle
Fan motor unit	Five years
Filter of front panel A	Same time of the fan motor replacement
Filter of front panel (lower)	Same time of the fan motor replacement

Tightening Torque

Tighten the screw at the standard tightening torque below when securing the parts.

Screw Size	Standard Tightening Torque
M 2.6	0.5 to 0.6 N•m {5 to 6 kgf•cm}
M 3.0	0.7 to 1.0 N•m {7 to 10 kgf•cm}
M 4.0	1.2 to 1.6 N•m {12 to 16 kgf•cm}

2-4-2. Power Supply Unit Replacement

When the POWER A or POWER B indicator on the front panel flashes in red, any trouble occurs in the power supply unit.
In such a case, check that the power cord is connected tightly.
If indicator flashes in red though the power cord is connected, replace the power supply unit corresponded to the flashing indicator. The power supply unit on the left is POWER A, and the power supply unit on the right is POWER B.

Note

The status of the power supply unit can be checked on the menu “Service : Device”. (For the menu operations, refer to the operation manual.)

- “Rdy” : Legal status
- “Err” : Illegal status
- “Non” : Not mounted

```
>Exit      Service : Device
           Device            STS  Hours (h)
           Power Supply A    Rdy  2400
           Power Supply B    Err  3200
```

When two power supply units are installed in the MAV-70, either one of two power supply units can be replaced during the power on.

Note

When replacing the power supply unit during the power on, the following precautions should be followed.

- Be sure to put on the earth-band to establish a ground. If not, this may cause malfunction.
- Be careful not to give any shock to HDD.
- Replace the power supply unit within three minutes in consideration of air cooling effect.

Replacement part

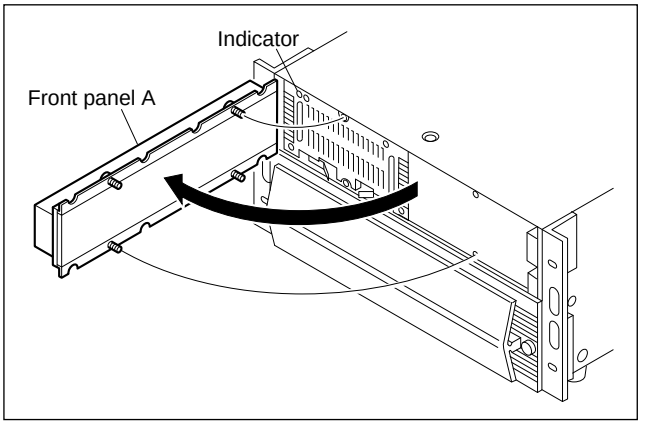
Please order the BKMA-PS70 (Redundant Power Supply Unit).

Note

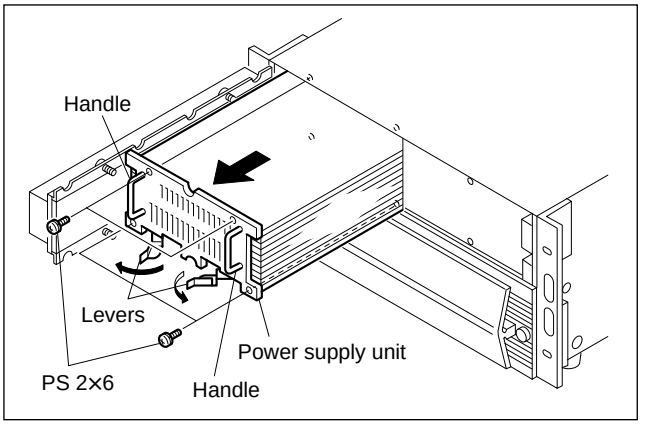
The parts in a power supply unit cannot be replaced. Be sure to replace the whole power supply unit.

Removal procedures

1. Remove the ornamental panel A. (Refer to the Section 2-2-1.)
2. Loosen the four screws (⇐ marked) of the front panel A fully, and open the front panel A.
   Note
   Be careful that the stopper washers don't come off the screws.
3. Make sure that indicator of the power supply unit to be replaced lights off.



4. Turn off the power switch corresponded to the power supply unit to be replaced.
   Note
   Be careful not to turn off the other power switch.
5. Remove the four screws fixing the power supply unit.
6. Pull the levers in the direction shown by the arrows, then grasp the handles and pull out the power supply unit.



Note

When removing the power supply unit other than replacement, to prevent contact detects of the power supply unit, do not touch the connector of the removed power supply unit.

Installation procedures

1. Insert a new power supply unit into the slot and push the power supply unit as far as it will go.
   Note
   Never give a shock to the HDD when inserting the power supply unit.
2. Secure the power supply unit with the four screws.
3. Close the front panel A.
4. Install the ornamental panel A. (Refer to the Section 2-2-1.)

Note

When installing only one power supply unit, be sure to install the blank panel on vacant slot. (To enhance air-cooling effects.)

CAUTION

Tighten the screws of power supply unit.
If the power supply unit is not secured completely, the contact resistance of the power connector will be increased and may cause parts damage or smoking.

Confirmation after replacement

1. Turn on the power.
2. Make sure that the POWER A or POWER B indicator lights in green.
3. Open the menu "Service : Device" on the LCD display, and make sure that "STS" (status) of "Power Supply A" or "Power Supply B" is "Rdy". (For the menu operations, refer to the operation manual.)

```
>Exit      Service : Device
           Device          STS  Hours (h)
           Power Supply A  Rdy  2400
           Power Supply B  Rdy  3200
```

Setting after replacement

Open the menu "Service : Hours Meter" on the LCD display, and reset the hours meter. (For the menu operations, refer to the operation manual.)

```
>Exit      Service : Hours Meter
           Enclosure       2400h
  Reset    Power Supply A  [2400] h
           Power Supply B  2400h
```

2-4-3. HDD Unit Replacement

When “R” (A rebuild request for HDD has been generated) is flashing in the upper-right portion of “Home” display, or when “Non”, “Err” or “Req” is generated on the menu “Disk” display, replace the corresponding HDD unit. (For the menu operations, refer to the operation manual.)

- “Non” : Not detected
- “Err” : HDD error
- “Req” : HDD exchange request generated

```
>Exit      Disks                          Remain=100%
  Exchg
  Rebuild -1-  -2-  -3-  -4-  -5-  -6-  -7-  -8-
  Format  Req  Rdy  Rdy  Rdy  Rdy  Rdy  Rdy  Rdy
```

The HDD unit can be replaced during the power on.

Note

When replacing the HDD unit during the power on, the following precautions should be followed.

- Be sure to put on the earth-band to establish a ground. If not, this may cause malfunction.
- Be careful not to give any shock to another HDD.
- Replace the power supply unit within three minutes in consideration of air cooling effect.

Replacement part

Please order the RKMA70-D (Recommended Parts Kit) or RKMA70-R (Recommended Parts Kit).
The RKMA70-R is a recycled hard disk.

Stopping the HDD

Stop the HDD to be replaced using the menu “Disks : Exchange”. (For the menu operations, refer to the operation manual.)

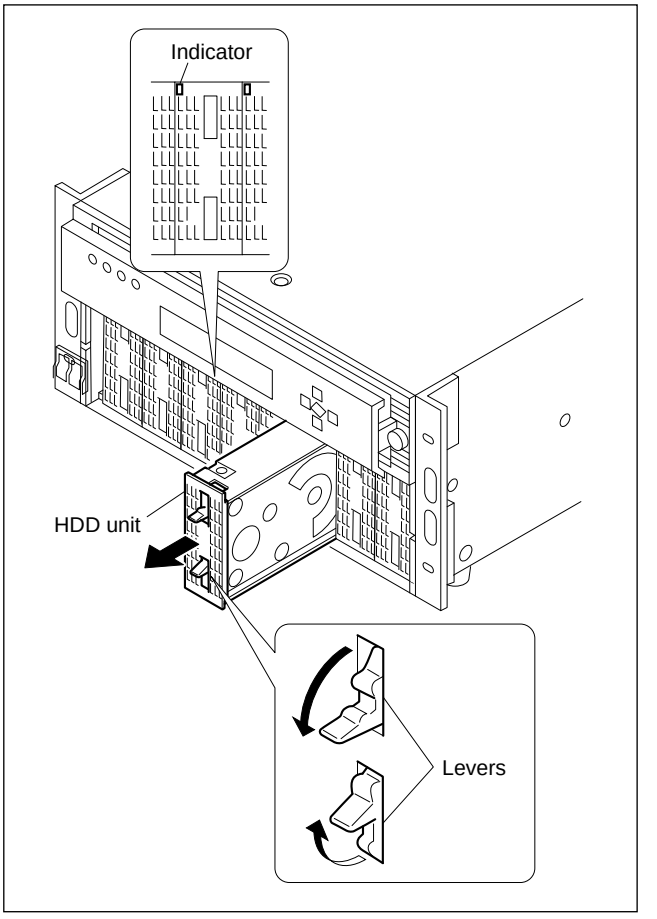
Note

In the menu “Disks : Exchange”, the HDD in the “Req” status is automatically selected.
Set the menu select cursor to “Stop”, and press the ENTER key. The HDD will stop.

```
  Exit      Disks      : Exchange
>Stop
  Start     ∗1∗  -2-  -3-  -4-  -5-  -6-  -7-  -8-
              Req  Rdy  Rdy  Rdy  Rdy  Rdy  Rdy  Rdy
```

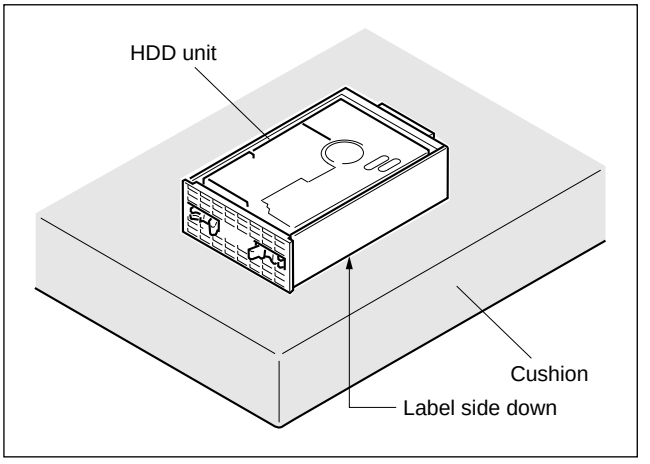
Removal procedures

1. Remove the front panel (lower). (Refer to the Section 2-2-1.)
2. Make sure that indicator of the HDD unit to be replaced lights off.
3. Remove the HDD unit gently while pressing the levers in the direction of the arrows.



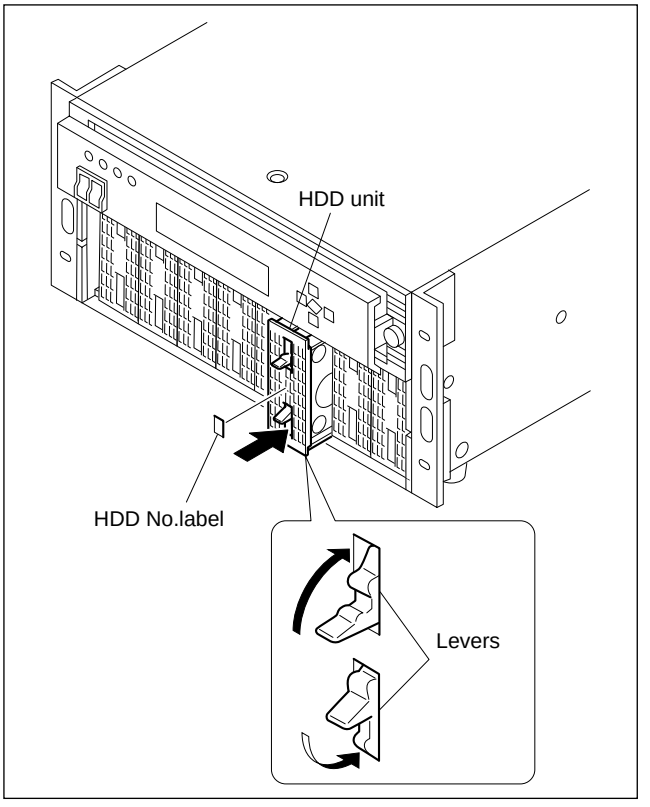
Note

Place the removed HDD unit on the cushion with the warranty label side down.



Installation procedures

1. Insert a new HDD unit into the slot gently, and press the levers in the direction of the arrows to lock the HDD unit.
2. Attach the HDD No.label which has same number as removed HDD to the front of the new HDD unit.
   • HDD No. label : 3-605-401-01



3. See the LCD display, and make sure that the status is “Stp”.

```
  Exit      Disks       : Exchange
>Stop
  Start     ∗1∗  -2-  -3-  -4-  -5-  -6-  -7-  -8-
             Stp  Rdy  Rdy  Rdy  Rdy  Rdy  Rdy  Rdy
```

4. Install the front panel (lower). (Refer to the Section 2-2-1.)

Starting the HDD

Set the menu select cursor to “Start”, and press the ENTER key.

```
  Exit      Disks       : Exchange
  Stop
>Start    ∗1∗  -2-  -3-  -4-  -5-  -6-  -7-  -8-
            Stp  Rdy  Rdy  Rdy  Rdy  Rdy  Rdy  Rdy
```

The drive will start, and a rebuild operation is automatically executed when spin-up of the drive is completed.

Note

The menu “Service : Disks : Exchange” also enables you to stop or start up a HDD. The menu “Service : Disks : Exchange” is used to stop a HDD without “Req” (drive exchange request).
Select and stop a HDD with extra care. If two or more HDDs are selected, recording/playback may be disabled. With a rebuild request for HDD has been generated, if other HDD is stopped, recording/playback may be disabled.

```
>Exit     Service     : Disks          : Exchange
  Mark                  ↓
  Stop      ∗1∗  -2-  -3-  ∗4∗  -5-  -6-  -7-  -8-
  Start      Rdy  Rdy  Rdy  Req  Rdy  Rdy  Rdy  Rdy
```

2-4-4. Fan Motor Replacement

When “Err” (illegal status) is generated on the status of the fan motor in the menu “Service : Device”, replace the fan motor unit or a failed fan motor.

```
>Exit      Service : Device
           Device              STS  Hours (h)
           Fan Unit Upper 1    Rdy  2400
           Fan Unit Upper 2    Err  3200
```

This section describes the replacement procedures of the fan motor unit and replacement procedures of the fan motor.

Fan Motor Unit Replacement

It is recommended to replace the fan motor unit periodically. The fan motor unit can be replaced during the power on.

Note

When replacing the fan motor unit during the power on, the following precautions should be followed.

- Be sure to put on the earth-band to establish a ground. If not, this may cause malfunction.
- Be careful not to give any shock to HDD.
- Replace the power supply unit within one minute in consideration of air cooling effect.

Replacement part

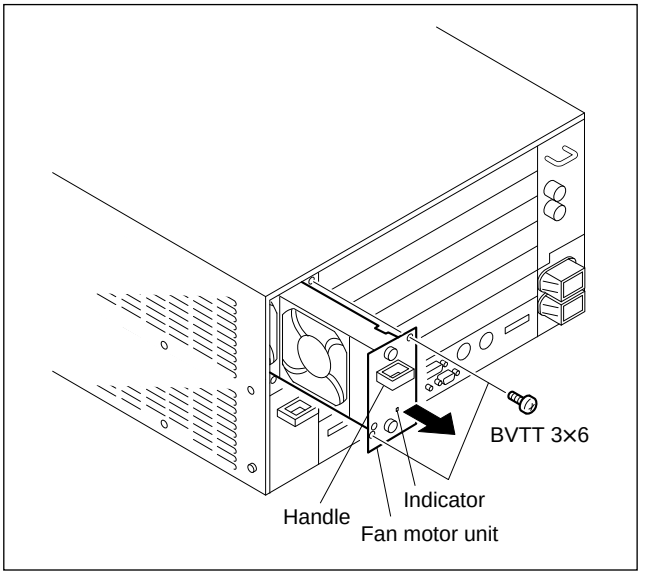
Fan motor assembly : A-8320-041-A

Removal procedures

1. Make sure that indicator of the fan motor unit to be replaced lights off.
2. Remove the two screws indicated ⇐ marks, then grasp the handle and pull out the fan motor unit.

   Note

   Touching the rotating fan may cause injury.
   Replace the fan motor with extra care in a live state of the unit.



Installation procedures

1. Insert a new fan motor unit into the slot and push the fan motor unit as far as it will go.
2. Secure the fan motor unit with the two screws.

Confirmation after replacement

1. Make sure that indicator of a new fan motor unit lights in green.
2. Make sure that all fans rotate properly. (Only when possible)
3. Open the menu “Service : Device” on the LCD display, and make sure that “STS” (status) of fan unit is “Rdy”. (For the menu operations, refer to the operation manual.)

```
>Exit        Service : Device
             Device              STS  Hours (h)
             Fan Unit Upper 1    Rdy  2400
             Fan Unit Upper 2    Rdy  3200
```

Setting after replacement

Open the menu “Service : Hours Meter” on the LCD display, and reset the hours meter. (For the menu operations, refer to the operation manual.)

```
>Exit        Service : Hours Meter

 Reset    Fan Unit Upper 1   [2400] h
          Fan Unit Upper 2   2400h
```

Fan Motor Replacement

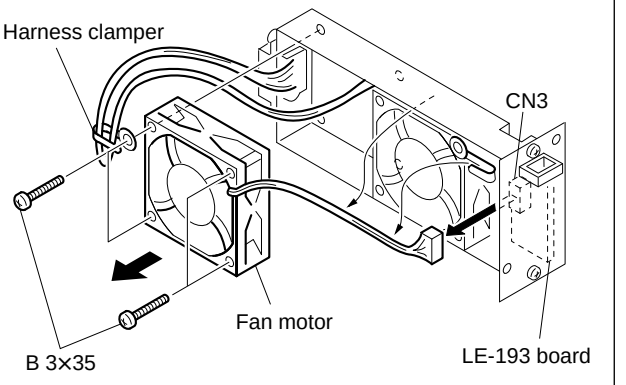
Replacement part

Fan motor : 1-763-175-11

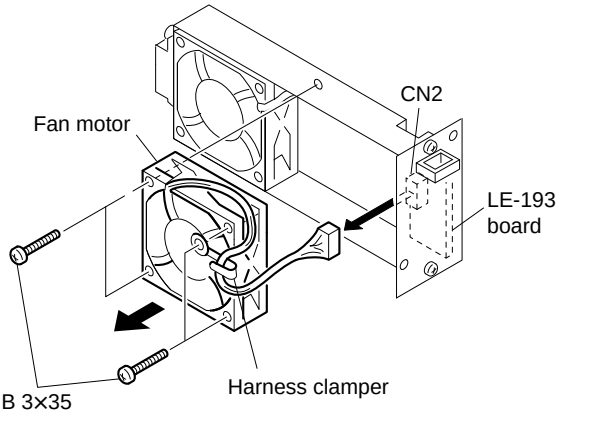
Removal procedures

1. Turn the power off.
2. Remove the fan motor unit. (Refer to the previous page.)
3. Loosen the harness clamper.
4. Remove the four screws, and remove the fan motor. At this time, the harness clamper is removed with the fan motor.
5. Disconnect the connector on the LE-193 board.
   - Fan (1) : CN3
   - Fan (2) : CN2

< To remove the fan (1) >

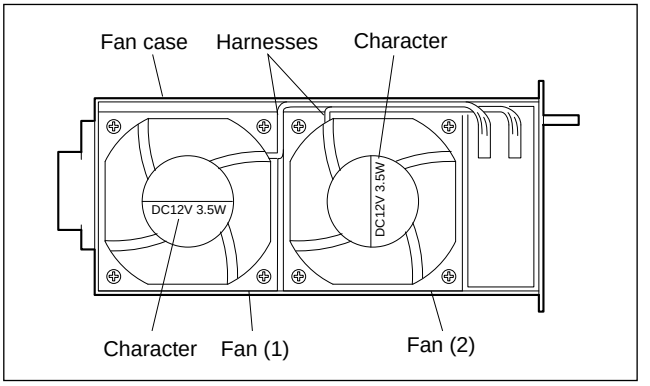


< To remove the fan (2) >



Installation procedures

1. Put a new fan motor into the fan case positioning each as shown in the figure.



2. Connect the connector on the LE-193 board.
   - Fan (1) : CN3
   - Fan (2) : CN2

3. Tuck the harness into the fan case prevent the exit of it.
4. Tighten the four screws with the harness clamper.
5. When fan (2) is installed, fix the harness with the harness clamper.
6. Install the fan motor unit. (Refer to the previous page.)

Confirmation after replacement

1. Turn the power on.
2. Make sure that indicator of the fan motor unit lights in green.
3. Make sure that all fans rotate properly. (Only when possible)
4. Open the menu “Service : Device” on the LCD display, and make sure that “STS” (status) of fan unit is “Rdy”. (For the menu operations, refer to the operation manual.)

```
>Exit      Service : Device
           Device              STS  Hours (h)
           Fan Unit Upper 1    Rdy  2400
           Fan Unit Upper 2    Rdy  3200
```

Setting after replacement

Open the menu “Service : Hours Meter” on the LCD display, and reset the hours meter. (For the menu operations, refer to the operation manual.)

```
>Exit      Service : Hours Meter

 Reset     Fan Unit Upper 1   [2400] h
           Fan Unit Upper 2   2400h
```

2-4-5. Filter Replacement

Two filters are installed in the MAV-70. One is on the back of the front panel A, the other is on the back of the front panel (lower).
When dust is accumulated on the filter, ventilation is prevented and inside of the unit will be overheated. This may cause the malfunction.
It is recommended to replace the filters at the same time of fan motor replacement.

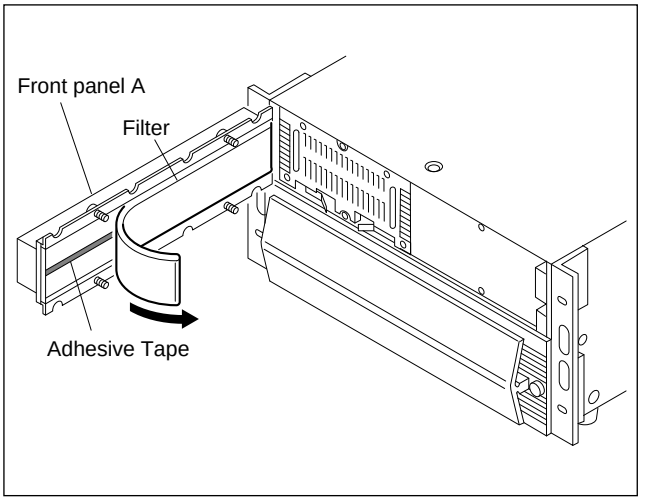
Filter on the Front Panel A Replacement

Replacement part

LCD filter : 3-615-871-01

Removal procedures

1. Remove the ornamental panel A. (Refer to the Section 2-2-1.)
2. Loosen the four screws (⇐ marked) of the front panel A fully, and open the front panel A.
3. Peel the filter away from the tape.



Installation procedures

1. Fasten a new filter to the tape.
2. Close the front panel A.
3. Install the ornamental panel A. (Refer to the Section 2-2-1.)

Setting after replacement

It is not necessary to set after filter replacement.

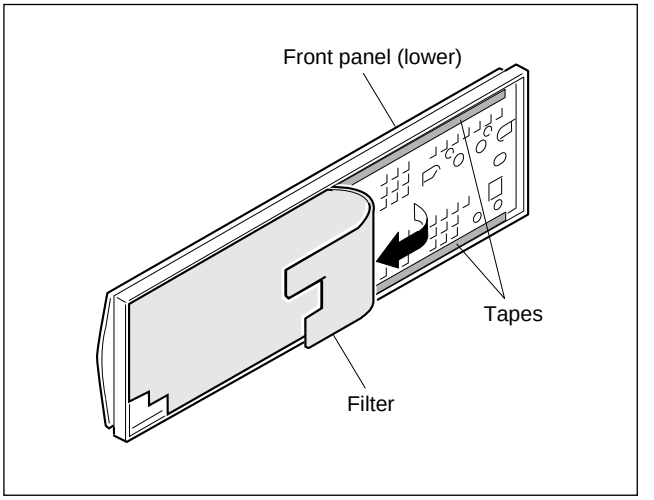
Filter on the Front Panel (Lower) Replacement

Replacement part

Filter : 3-615-894-01

Removal procedures

1. Remove the front panel (lower). (Refer to the Section 2-2-1.)
2. Peel the filter away from the tapes.



Installation procedures

1. Fasten a new filter to the tapes.
2. Install the front panel (lower). (Refer to the Section 2-2-1.)

Setting after replacement

It is not necessary to set after filter replacement.

2-4-6. Backup Battery Replacement

WARNING

Observe the following cautions. If not, bursting, ignition, and heating may occur in the battery.

- Do not charge, short, disassemble, deform, and heat the battery or put it in a fire.
- Replace the battery with the same type one or one specified by the manufacturer.
- Attach a tape to the plus + and minus − terminals for insulation so that they do not touch other metals or batteries when throwing the battery away.

CAUTION

Observe the following caution. If not, bursting and liquid leakage may occur in the battery.

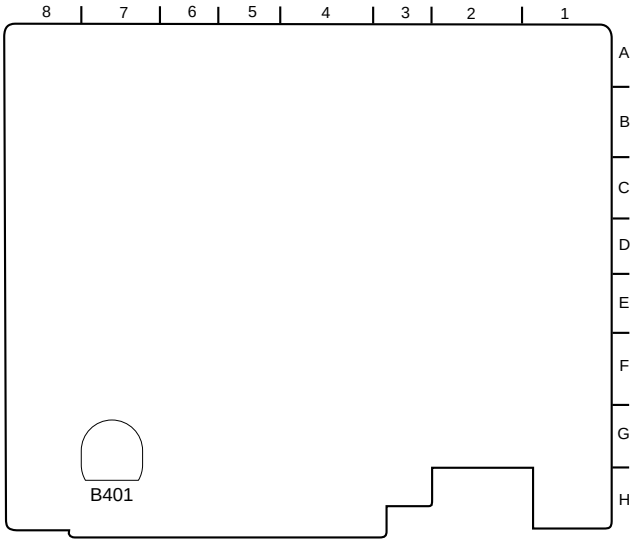
- Set the polarity + of the battery toward the polarity + printing on the board.

The SY-253 board and PU-102 board have lithium batteries for data backup.

Board Name	Ref.No.	Item	Battery-backed IC	Stored data	Recommended Replacement Cycle*1
SY-253	B401	CR2025	IC406, 407, 414, 415, 421, 422, 432, 433	Database of file	Three years
	B302	M4T28-BR12SH1	IC302	Various setting parameters of the menus	Ten years
PU-102	B301	M4Z28-BR00SH1	IC301	Error information of HDD	Ten years

*1 : The batteries of the MAV-70 are not consumed during the power to the board turned on. Therefore, this replacement cycle of the battery indicates the period at which the power to the board is not turned on.

B401 (CR2025) on the SY-253 Board Replacement



Note

The battery B401 (CR2025) backs up the database of file. Replace this battery within 24 hours after the SY-253 board is pulled out from the slot.
If 24 hours or more have passed, the backup data will be lost.

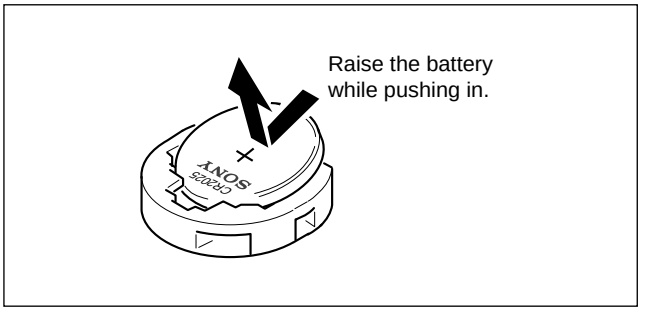
Replacement part

Obtain a commercial lithium battery.

Part name :	Lithium battery	
Specifications :	Model	CR2025
	Voltage	3 V
	Capacity	120 mAH

Removal procedures

1. Remove the SY-253 board. (Refer to the Section 2-5-9.)
2. Remove the battery.



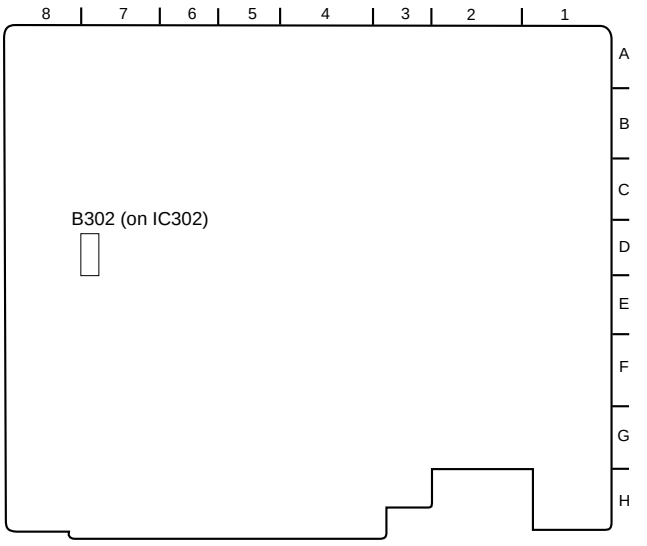
Installation procedures

1. Install a new battery on the SY-253 board.
   At this time, put the lithium battery with the “+” terminal side up.
2. Insert the SY-253 board in its original slot.

Setting after replacement

It is not necessary to set after battery replacement.

B302 (M4T28-BR12SH1) on the SY-253 Board Replacement



Note

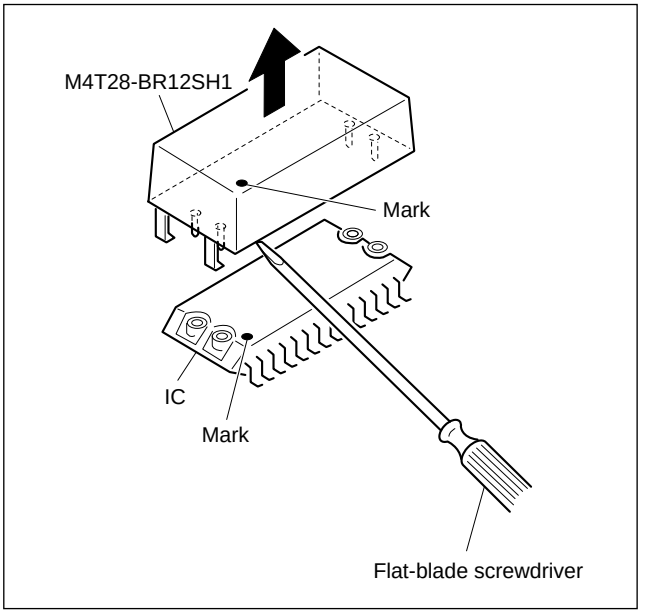
The battery B302 (M4T28-BR12SH1) backs up the various setting parameters of the menus.
This data is lost at the time when the battery is removed. Before replacing the battery, write down the setting parameters of the menus. (For the menu operations, refer to the operation manual.)

Replacement part

Part name : Lithium battery, M4T28-BR12SH1
Part number : 1-767-156-11

Removal procedures

1. Write down the setting parameters of the following menus. (For the menu operations, refer to the operation manual.)
   - Board parameter : "Boards : Param"
   - System Configuration : "Service : Configuration"
   - Hours Meter : "Service : Hours Meter"
2. Remove the SY-253 board. (Refer to the Section 2-5-9.)
3. Insert a tip of a flat-blade screwdriver between IC and battery to remove the battery.



Installation procedures

1. Align a new battery with the mark of IC, and insert it.
2. Install the SY-253 board in its original slot.

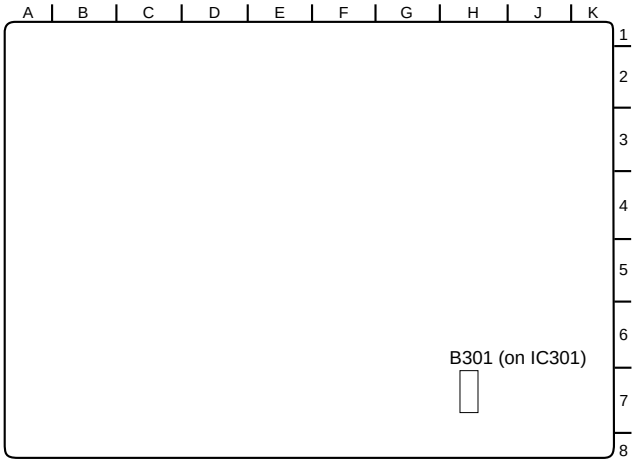
Setting after replacement

Set the following menus. (For the menu operations, refer to the operation manual.)
- Board parameter : "Boards : Param"
- System Configuration : "Service : Configuration"

Note

The hours meter cannot be set.

B301 (M4Z28-BR00SH1) on the PU-102 Board Replacement



Note

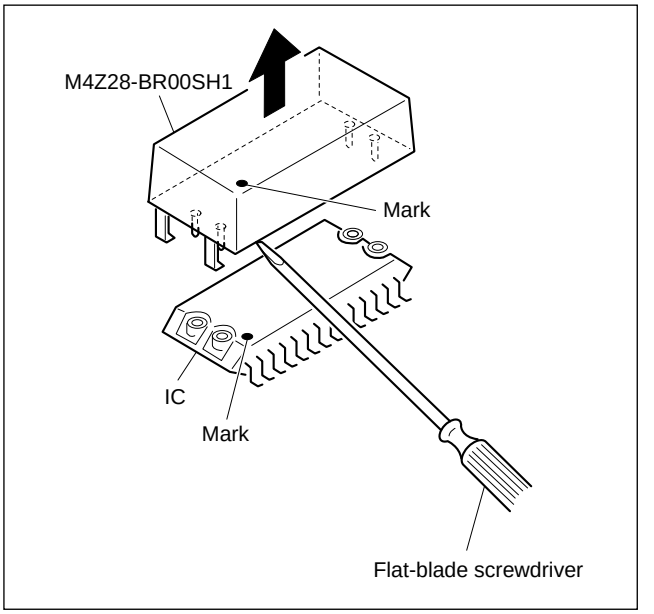
The battery B301 (M4Z28-BR00SH1) backs up error information of HDD.
This data is lost at the time when the battery is removed. Before replacing the battery, store the error information of HDD in a personal computer. (For the backup, refer to "1-4. Uploading and Downloading the Contents of Memory (PU-102 board)".)
If error information is lost, video/audio noise may be caused when an error containing file is played back.

Replacement part

Part name : Mold-type lithium battery
Part number : 1-528-749-11

Removal procedures

1. Store the error information of HDD in a personal computer. (For the backup, refer to "1-4. Uploading and Downloading the Contents of Memory (PU-102 board)".)
2. Remove the PU-102 board. (Refer to the Section 2-5-10.)
3. Insert a tip of a flat-blade screwdriver between IC and battery to remove the battery.



Installation procedures

1. Align a new battery with the mark of IC, and insert it.
2. Install the PU-102 board in its original slot.

Setting after replacement

Download the stored error information of HDD from the personal computer. (For the downloading, refer to "1-4. Uploading and Downloading the Contents of Memory (PU-102 board)".)

2-5. Boards Replacement

Product Service

The following optional boards are supplied with a product.

Optional Board	Product
AD-156	BKMA-7050
DA-143	BKMA-7060
DEC-98	BKMA-7030
ENC-47	BKMA-7020
IF-677	BKMA-7040

Standard Tightening Torque

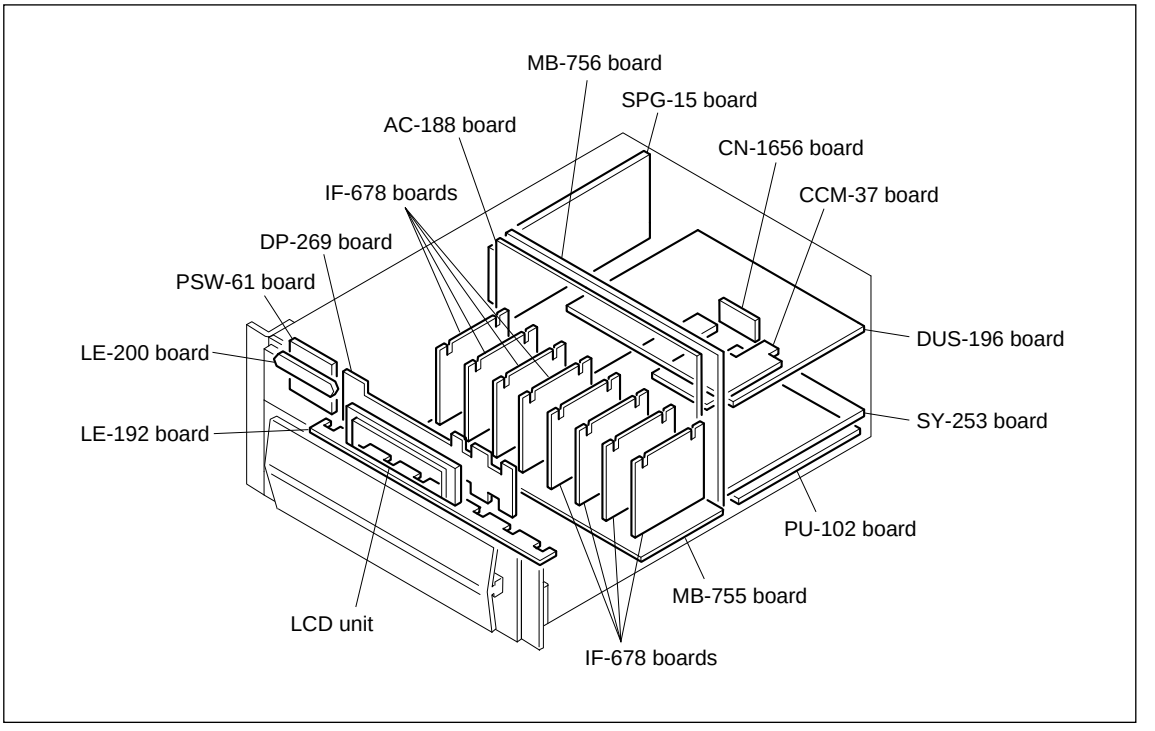
When tightening the screws, torque the screws to the following value.

Screw Size	Standard Tightening Torque
M2.6	0.5 to 0.6 N•m {5 to 6 kgf•cm}
M3.0	0.7 to 1.0 N•m {7 to 10 kgf•cm}
M4.0	1.2 to 1.6 N•m {12 to 16 kgf•cm}

Boards Replacement

This section describes the boards replacement as follows. After the board is replaced, set the switches on the board refering to the installation manuals.

Model	Boards	Section
MAV-70	AC-188	2-5-7
	CCM-37	2-5-9
	CN-1405	2-5-1
	CN-1656	2-5-9
	DP-269	2-5-3
	IF-678	2-5-2
	LE-200	2-5-3
	MB-755	2-5-6
	MB-756	2-5-8
	PSW-61	2-5-4
	PU-102	2-5-10
	SY-253	2-5-9

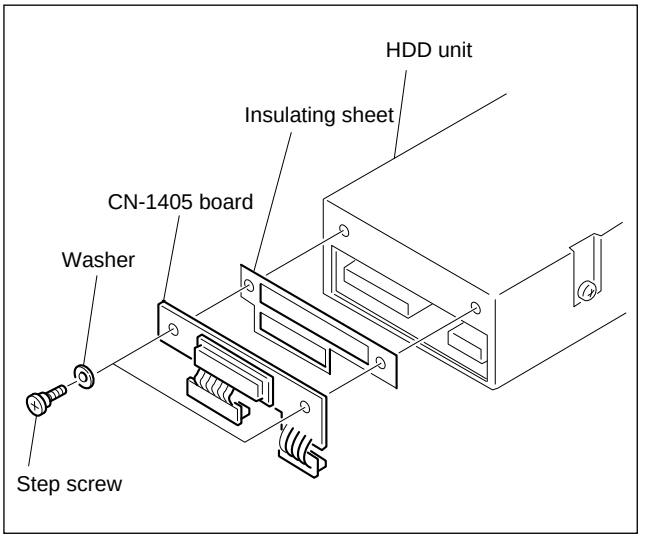


2-5-1. CN-1405 Board

Note

When the CN-1405 board is replaced, be sure to put on an earth-band to establish a ground.

1. Disconnect the power cords from the rear panel.
2. Remove the front panel (lower). (Refer to Section 2-2-1.)
3. Remove the HDD unit on the cushion gently. (Refer to Section 2-4-3.)
4. Remove the two connectors of the harness connected to the HDD gently.
5. Remove the two screws and CN-1405 board.



6. Replace the CN-1405 board and perform the removal procedures in reverse order.

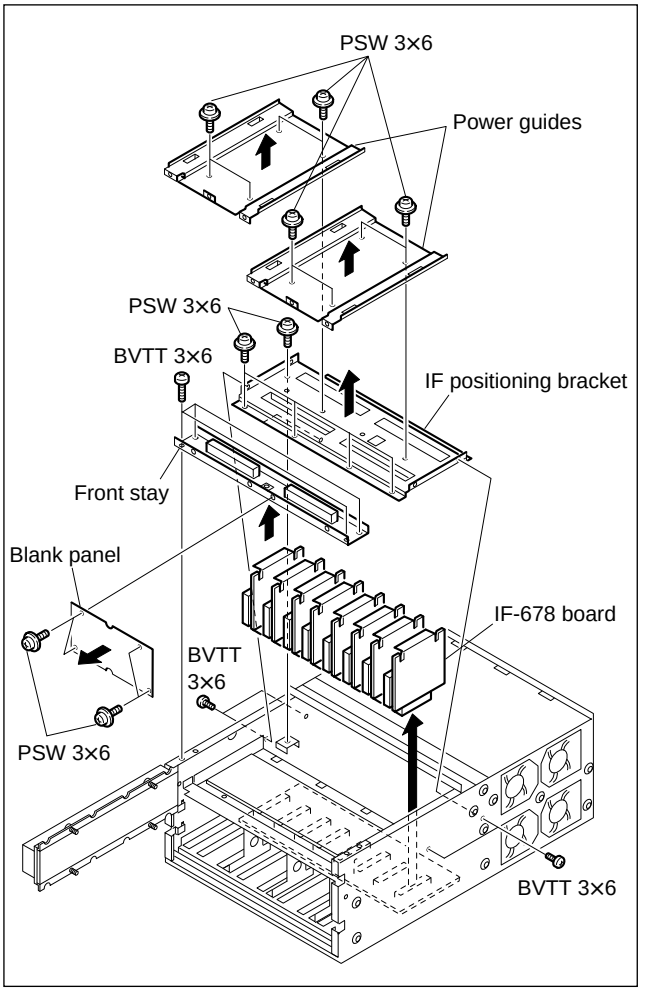
Note

When the CN-1405 board is installed, use the torque driver as shown below to avoid the shock to the HDD.

Shockless torque screwdriver
1.2N•m {12 kgf•cm} : J-6530-070-A

2-5-2. IF-678 Board

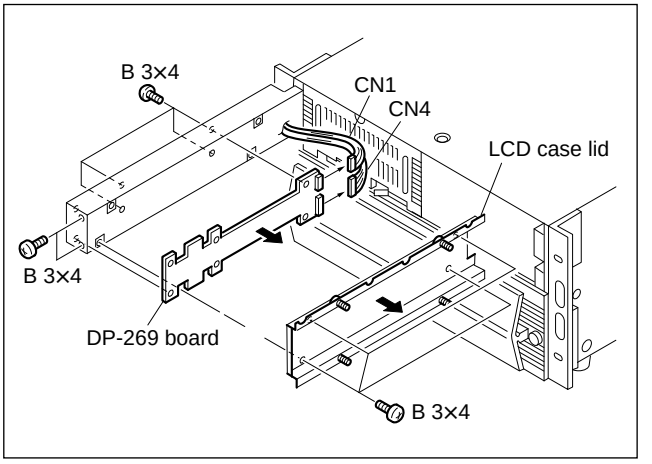
1. Disconnect the power cords from the rear panel.
2. Remove the cover. (Refer to Section 2-2-2.)
3. Remove the front panel (lower) and ornamental panel A. (Refer to Section 2-2-1.)
4. Open the front panel A. (Refer to Section2-4-2.)
5. Remove the power supply units. (Refer to Section 2-4-2.)
   When there is one power supply, remove the four screws (PSW 3×6) and blank panel.
6. Remove the all HDD units.(Refer to Section 2-4-3.)
7. Remove the four screws (BVTT 3×6) and front stay.
8. Remove the eight screws (PSW 3×6) and two power guides.
9. Remove the five screws (PSW 3×6) and four screws (BVTT 3×6), then remove the IF positioning bracket.
10. Remove and replace the IF-678 board.
    Note
    The IF-678 boards correspond to each HDD unit.



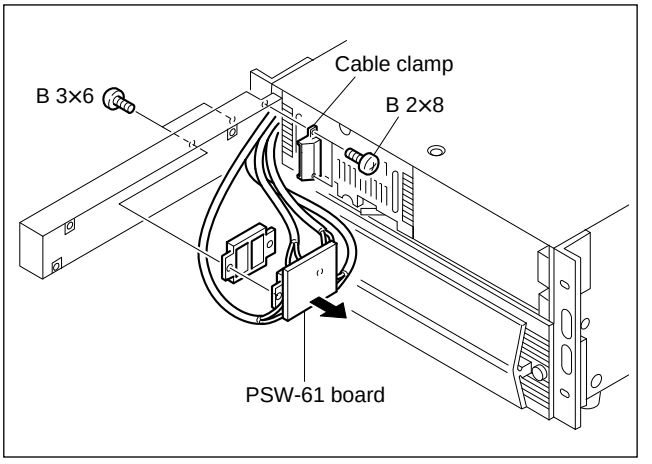
11. For installation, perform the removal procedures in reverse order.

2-5-3. DP-269/LE-200 Boards

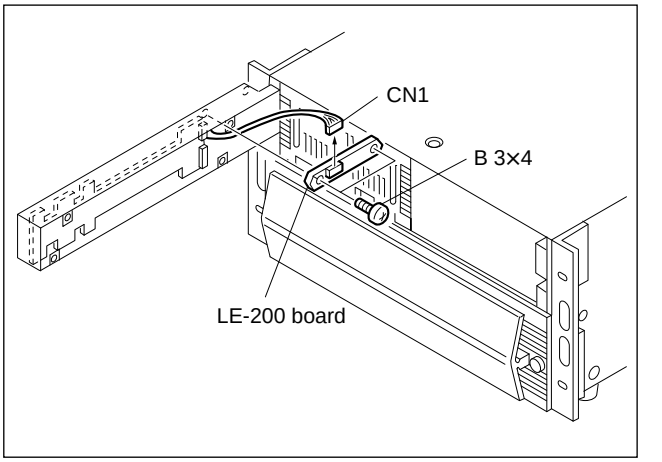
1. Disconnect the power cords from the rear panel.
2. Remove the ornamental panel A. (Refer to Section 2-2-1.)
3. Open the front panel A. (Refer to Section 2-4-2.)
4. Unstick the filter from the front panel A. (Refer to Section 2-4-5.)
5. Remove the four screws (B 3×4) and the LCD case lid.
6. Disconnect the two connectors (CN1, CN4) of the harness connected to the DP-269 board.
7. Remove the six screws (B 3×4) and DP-269 board.



8. Remove the two screws (B 2×8) and cable clamp.
9. Remove the two screws (B 3×6) and PSW-61 board from the front panel A.



10. Remove the two screws (B 3×4) and disconnect the connector (CN1) of the harness connected to the LE-200 board.
11. Remove the LE-200 board.



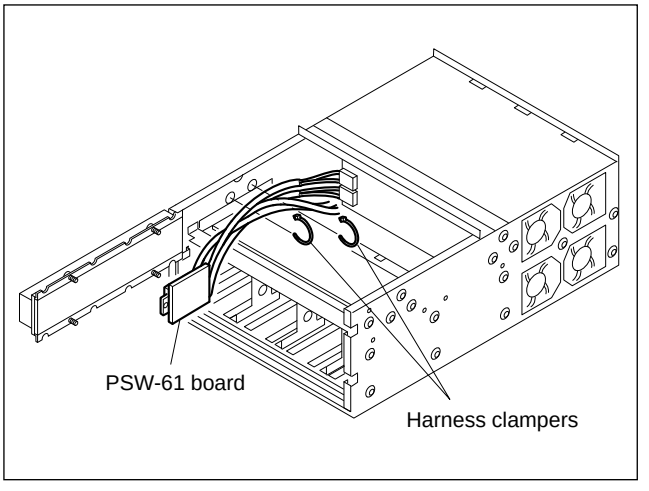
12. For installation, perform the removal procedures in reverse order.

2-5-4. PSW-61 Board

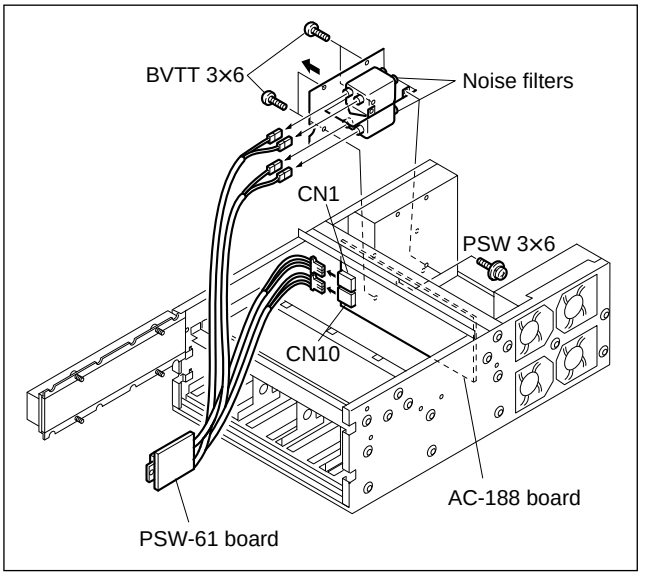
Note

When the PSW-61 board is replaced, replace a whole harness (H61) that is connected to PSW-61 board.

1. Disconnect the power cords from the rear panel.
2. Remove the cover. (Refer to Section 2-2-2.)
3. Remove the front panel (lower) and ornamental panel A. (Refer to Section 2-2-1.)
4. Open the front panel A. (Refer to Section 2-4-2.)
5. Remove the power supply units. (Refer to Section 2-4-2.)
   When there is one power supply, remove the blank panel. (Refer to Section 2-5-2.)
6. Remove the all HDD units. (Refer to Section 2-4-3.)
7. Remove the front stay. (Refer to Section 2-5-2.)
8. Remove the two power guides. (Refer to Section 2-5-2.)
9. Remove the IF positioning bracket. (Refer to Section 2-5-2.)
10. Unstick the filter from the front panel A. (Refer to Section 2-4-5.)
11. Remove the LCD case lid. (Refer to Section 2-5-3.)
12. Disconnect the two connectors (CN1, CN4) of the harness connected to the DP-269 board. (Refer to Section 2-5-3.)
13. Remove the DP-269 board. (Refer to Section 2-5-3.)
14. Remove the cable clamp. (Refer to Section 2-5-3.)
15. Remove the PSW-61 board from the front panel A. (Refer to Section 2-5-3.)
16. Cut the two harness clampers.



17. Disconnect the two connectors (CN1, CN10) of the harness connected to the AC-188 board .
18. Remove the all optional boards. (Refer to Section 2-5-5.)
19. Remove the four screws (BVTT 3×6) and two screws (PSW 3×6).
20. Pull out the noise filters until the harness is viewed.
    Note
    Be sure not to pull out the harness connected to the noise filter.
21. Remove the four connectors of the harness connected to the noise filters.
22. Remove the PSW-61 board connected to the harness (H61).



23. For installation, perform the removal procedures in reverse order.

Note

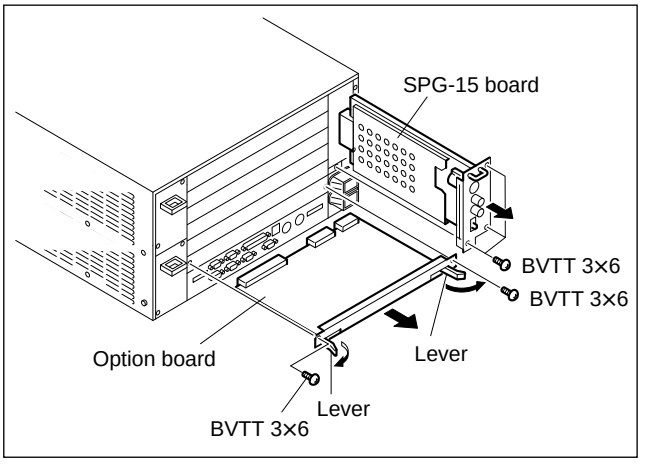
Use the commercially available harness clamper .

2-5-5. MB Board Assembly

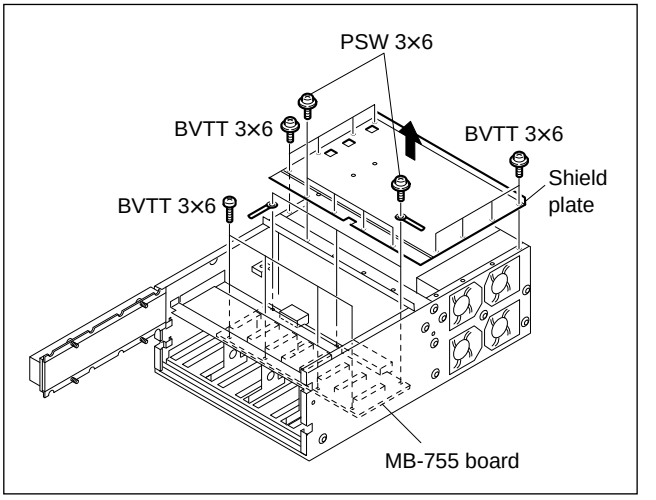
Note

It is necessary that removing the MB board assembly, before the AC-188, MB-755 and MB-756 boards are removed.

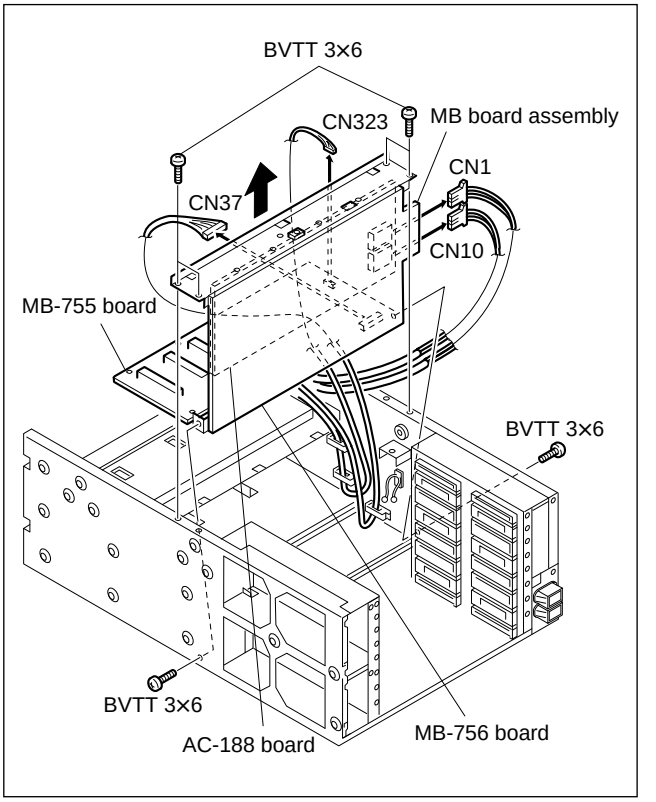
1. Disconnect the power cords from the rear panel.
2. Remove the cover. (Refer to Section 2-2-2.)
3. Remove the two screws (BVTT 3×6) on the optional boards, then remove the all optional boards.
4. Remove the four screws (BVTT 3×6) and SPG-15 board.



5. Remove the SY-253 board. (Refer to Section 2-5-9.)
6. Remove the PU-102 board. (Refer to Section 2-5-10.)
7. Remove the Fan motor units. (Refer to Section 2-4-4.)
8. Remove the front panel (lower) and ornamental panel A. (Refer to Section 2-2-1.)
9. Open the front panel A. (Refer to Section 2-4-2.)
10. Remove the power supply units. (Refer to Section 2-4-2.)
    When there is one power supply unit, remove the blank panel. (Refer to Section 2-5-2.)
11. Remove the all HDD units. (Refer to Section 2-4-3.)
12. Remove the front stay. (Refer to Section 2-5-2.)
13. Remove the two power guides. (Refer to Section 2-5-2.)
14. Remove the IF positioning bracket. (Refer to Section 2-5-2.)
15. Remove and replace the all IF-678 board. (Refer to Section 2-5-2.)
16. Remove the four screws (PSW 3×6) and eight screws (BVTT 3×6), then remove the shield plate.
17. Remove the four screws (BVTT 3×6) and three screws (PSW 3×6) securing the MB-755 board to the chassis.

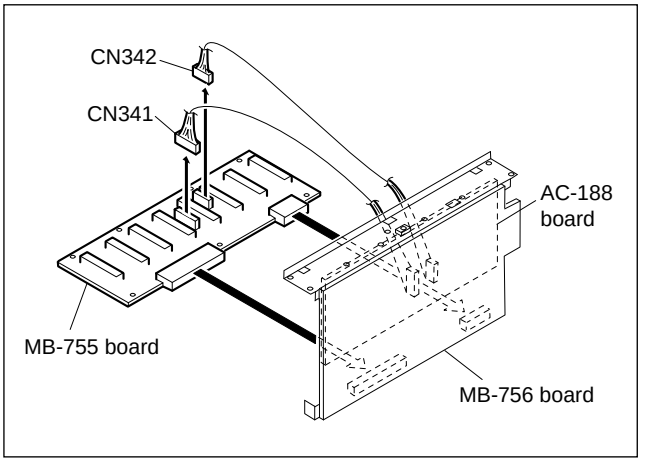


18. Disconnect the two connectors (CN1, CN10) of the harness connected the AC-188 board.
19. Disconnect the connector (CN37) of the harness connected the MB-756 board.
20. Disconnect the connector (CN323) of the harness connected the MB-755 board.
21. Remove the six screws (BVTT 3×6), then remove the MB board assembly in the direction of the arrow.



2-5-6. MB-755 Board

1. Remove the MB board assembly. (Refer to Section 2-5-5.)
2. Disconnect the connectors (CN341, CN342) of the harnesses connected to MB-755 board.
3. Remove the MB-755 board from the MB-756 board.



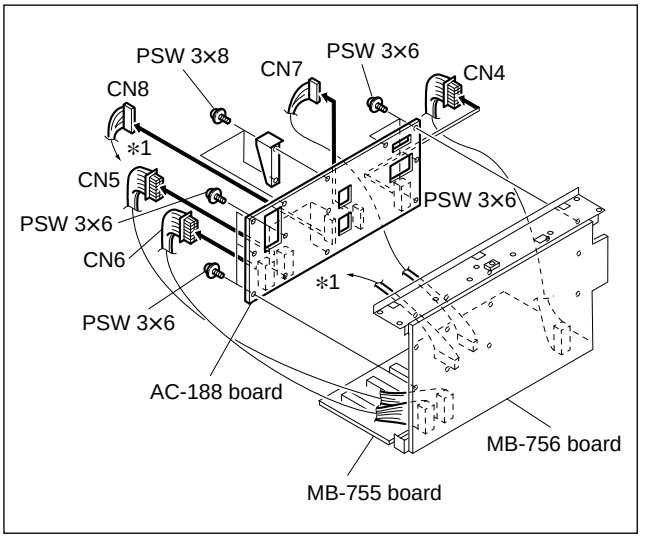
4. Replace the MB-755 board and perform the removal procedures in reverse order.

Note

When the MB-755 board is connected to the MB-756 board, be sure to connect an edge on each connector securely.

2-5-7. AC-188 Board

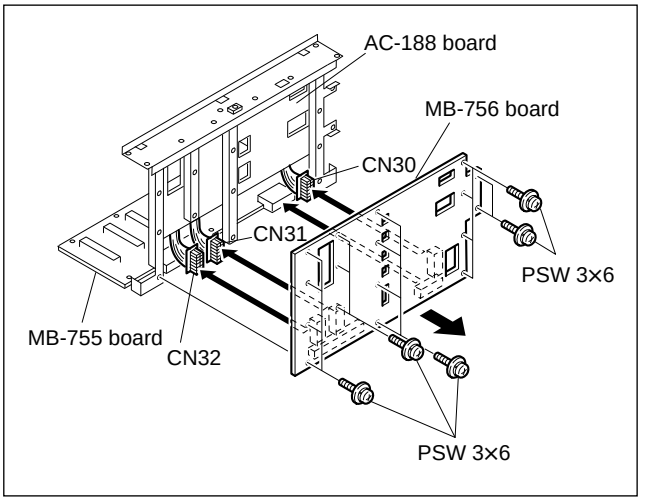
1. Remove the MB board assembly. (Refer to Section 2-5-5.)
2. Remove the connectors (CN4 to CN8) of the harnesses connected to the AC-188 board.
3. Remove the three screws (PSW3×8) and eleven screws (PSW 3×6), then remove the AC-188 board.



4. Replace the AC-188 board and perform the removal procedures in reverse order.

2-5-8. MB-756 Board

1. Remove the MB board assembly. (Refer to Section 2-5-5.)
2. Remove the connectors (CN30 to CN32) of the harness connected to the MB-756 board.
3. Remove the seventeen screws (PSW 3×6) and the MB-755 board from the MB-756 board.



4. Replace the MB-756 board and perform the removal procedures in reverse order.

Note

When the MB-756 board is connected to the MB-755 board, be sure to connect an edge on each connector securely.

2-5-9. SY-253/CN-1656/CCM-37 Boards

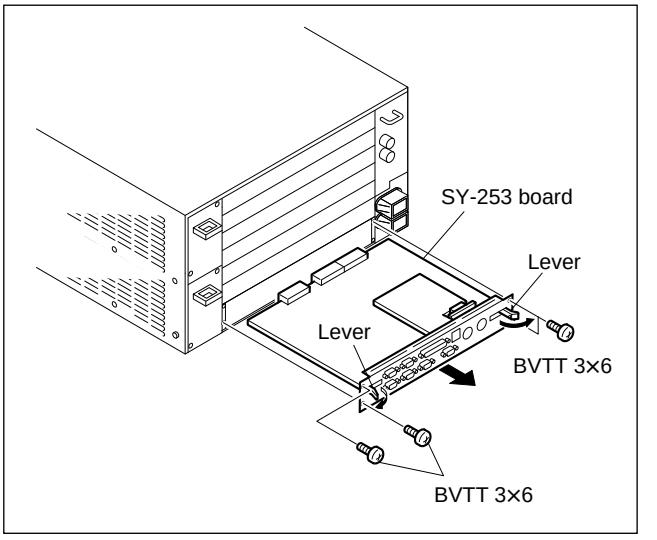
Notes

When the SY-258 board is replaced, it is necessary that the following settings are performed.

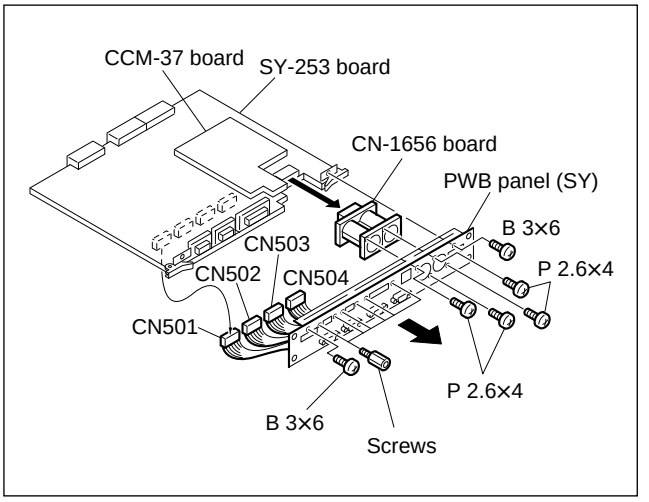
- Data upload/download
- Menu settings

  When the CCM-37 board is replaced, it is necessary that the Ethernet address setting is performed.

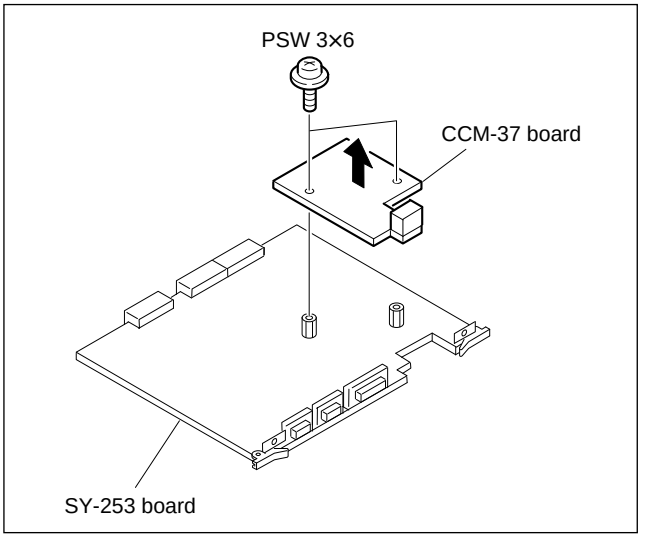
1. Upload the file data before the SY-253 board is replaced. (Refer to Section 1-3.)
2. Make a note of the following menu settings. (For menu operation, refer to the operation manual.)
   - Board parameter
   - System configuration
   - Hours meter
3. Disconnect the power cords from the rear panel.
4. Remove the four screws (BVTT 3×6).
5. Turn the board levers, pull out the SY-253 board



6. Remove the two screws (B 3×6) , four screws (P 2.6×4) , and the six screws.
7. Disconnect the connectors (CN501 to CN504) of the harness connected to the SY-253 board , and remove the PWB panel (SY).
8. Remove the CN-1656 board from the SY-253 board.



9. Remove the two screws (PSW 3×6) and CCM-37 board from the SY-253 board.



10. Replace the SY-253 board and perform the removal procedures in reverse order.
11. Download the file data. (Refer to Section 1-3.)
12. Set the menu data memorized in procedure 2.
    (For menu operation, refer to the operation manual.)
    - Board parameter
    - System configuration

    Note

    The hours meter can not be set.

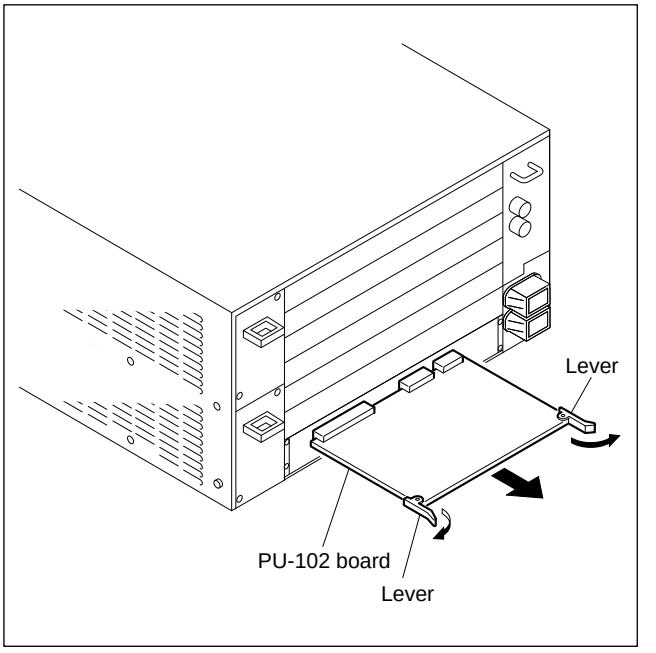
13. Set the Ethernet address.

2-5-10. PU-102 Board

Note

When the PU-102 board is replaced, it is necessary that the data uploading and downloading.

1. Upload the file data before the PU-102 board is replaced. (Refer to Section 1-4.)
2. Disconnect the power cords from the rear panel.
3. Remove the SY-253 board. (Refer to Section 2-5-9.)
4. Turn the board levers and pull out the PU-102 board.



5. Replace the board and reverse the removal procedure.
6. Download the file data. (Refer to Section 1-4.)

Section 3
Electrical Alignment

3-1. General Information for Electrical Adjustment

3-1-1. Equipment Required

Tools

- Extension board EX-647 assembly A-8321-004-A (For SPG-15 board)
- Extension board EX-648 assembly A-8321-005-A (For PU-102 board)
- Extension board EX-649 assembly A-8321-006-A (For SY-253 and option board)

Measurement equipment

- Oscilloscope Tektronix 2465 or the equivalent
- Frequency counter Advantest TR5821AK or the equivalent
- Audio oscillator Tektronix SG-5010 or the equivalent
- NTSC signal generator Tektronix 1410 or the equivalent
  Tektronix TSG-170A or the equivalent
- PAL signal generator Tektronix 1411 or the equivalent
  Tektronix TSG-271 or the equivalent
- NTSC waveform/vector monitor
  Tektronix 1780R or the equivalent
- PAL waveform/vector monitor
  Tektronix 1781R or the equivalent
- Audio level meter Hewlett Packard HP3400A or the equivalent
- Digital audio level meter Audio Precision PORTABLE ONE DUAL DOMAIN or the equivalent
- Personal Computer IBM-PC compatible computer
  (installed with Windows 95 or Windows 98)

3-1-2. Content of Nonvolatile Memory

The MAV-70 incorporates the nonvolatile memory and the memory backed up by a battery. Perform the operation below during board replacement and memory replacement.

AD-156 board

IC106 (EEPROM)

Contents : Adjustment data on AD-156 board
Operation after board replacement : Not required.
Operation after IC106 replacement : IC106 cannot be replaced independently. If IC106 is defective, replace the whole board.

CCM-37 board

IC105 (EEPROM)

Contents : Ethernet address
Operation after board replacement : Ethernet address setting
Operation after IC105 replacement : Ethernet address setting

DA-134 board

IC106 (EEPROM)

Contents : Adjustment data on DA-134 board
Operation after board replacement : Not required.
Operation after IC106 replacement : IC106 cannot be replaced independently. If IC106 is defective, replace the whole board.

IF-677 board

IC103 (EEPROM)

Contents :	Fiber channel address
Operation after board replacement :	Not required.
Operation after IC103 replacement :	IC103 cannot be replaced independently. If IC103 is defective, replace the whole board.

PU-102 board

IC134 (EEPROM)

Contents :	HDD information
Caution during board replacement :	The contents of memory are erased during board replacement. For more information, consult a Sony sales person.
Caution during IC134 replacement :	The contents of memory are erased during IC134 replacement. For more information, consult a Sony sales person.

IC301 (Backed up by a lithium battery (B301).)

Contents :	HDD error information
Caution during board replacement :	The contents of memory are erased during board replacement. For more information, consult a Sony sales person.
Caution during IC301 replacement :	The contents of memory are erased during IC301 replacement. For more information, consult a Sony sales person.

SY-253 board

IC302 (Backed up by a lithium battery (B302).)

Contents :	Menu setting value
Operation after board replacement :	Menu setting
Operation after IC302 replacement :	Menu setting

IC314 (EEPROM)

Contents :	Menu setting value
Operation after board replacement :	Menu setting
Operation after IC314 replacement :	Menu setting

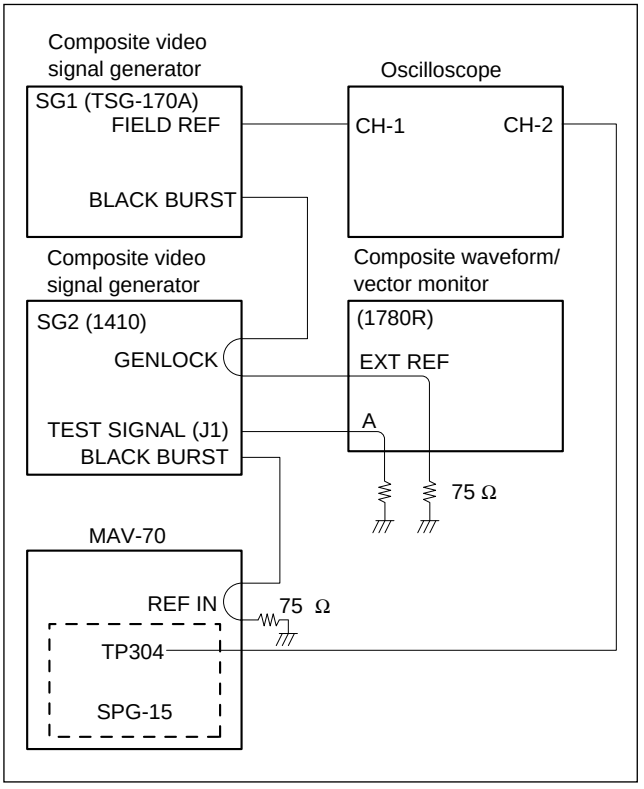
IC406, IC407, IC414, IC415, IC421, IC422, IC432, and IC433 (Backed up by a lithium battery (B401).)

Contents :	File database
Operation before board replacement :	Data uploading (Refer to Section 1-2.)
Operation after board replacement :	Data downloading (Refer to Section 1-2.)
Caution during IC134 replacement :	The contents of memory are erased during IC134 replacement. For more information, consult a Sony sales person.

3-2. SPG-15 Board Adjustment

3-2-1. NTSC SCH Adjustment

Connection

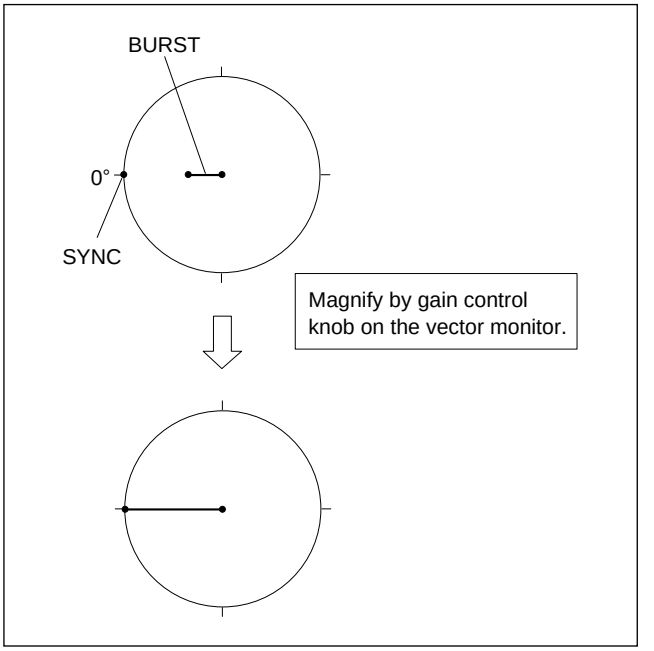


Preparation

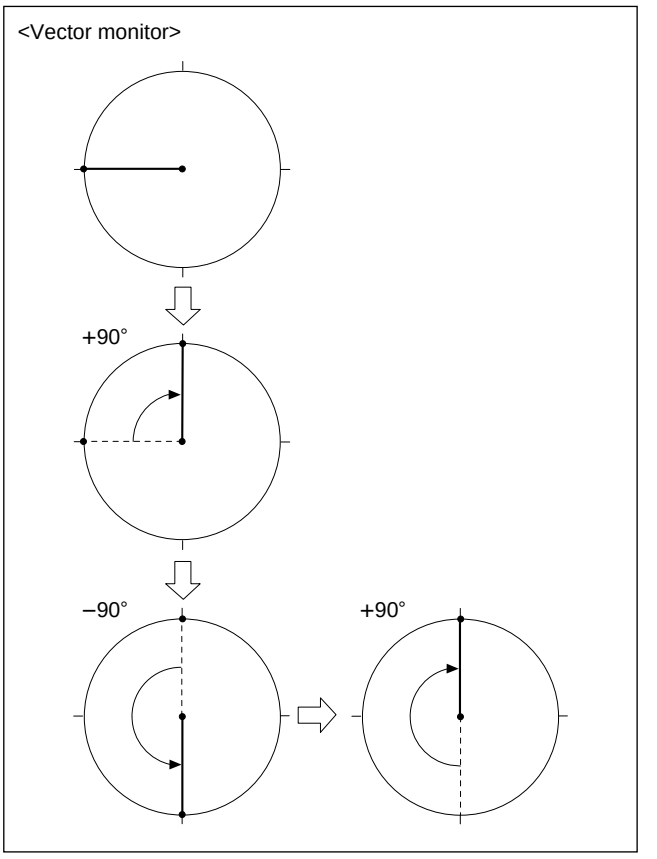
1. Connect the equipment.
2. Turn on the power of the MAV-70 and warm up the unit about 10 minutes.
3. Open the “Boards : Parameter Slot 7” menu, and set the Video Type to NTSC (NDF).
   (For operation, refer to the operation manual.)

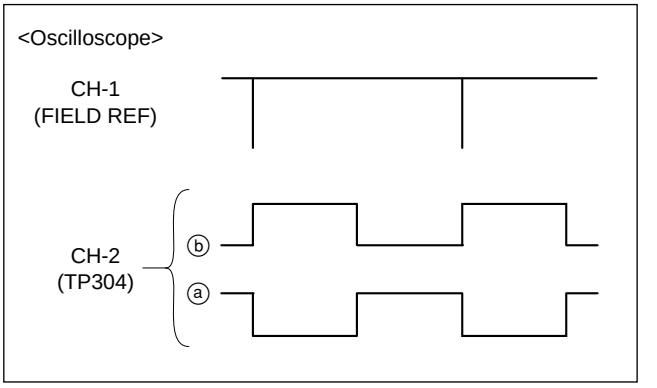
Adjustment Procedures

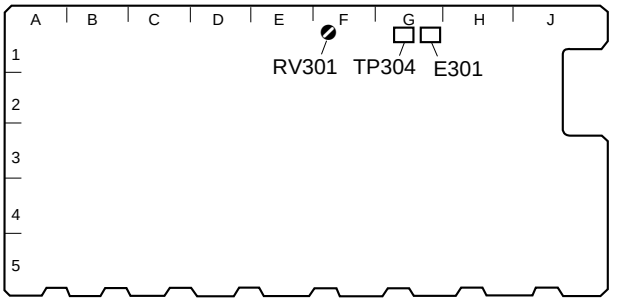
1. Set the equipment.
   - Vector monitor :
     SCH mode, INPUT : CH-A, EXT REF
   - Signal generator SG2 (1410) :
     SYNCHRONIZATION : GEN LOCK
2. Align the SYNC phase to 0° with the PHASE knob of the vector monitor so that the beam spot (SYNC) moves in the shortest route.
3. Align the BURST to reference position on the vector monitor with the SC PHASE knob of the signal generator SG2.
4. Align the beam spot of BURST to the circle scale on the vector monitor with the gain control knob on the vector monitor.



5. Set the oscilloscope.
   - VOLTS/DIV : DC 2V/DIV (CH-1, CH-2)
   - SEC/DIV : 10 ms/DIV
   - TRIG : CH-1
6. Connect the CH-2 prove of the oscilloscope to TP304 (G-1), and prove's GND to E301 (G-1).
7. Align the burst phase to +90° with the SC PHASE knob of the signal generator SG2 clockwise (↻) slowly.
8. Turn RV301 (F-1) clockwise (↻) slowly until the waveform of the oscilloscope's CH2 (TP304) change from ⓑ to ⓐ. (Immediately before changing from ⓑ to ⓐ.)
9. Align the burst phase to −90° with the SC PHASE knob of the signal generator SG2 counterclockwise (↺) slowly. Make sure that the waveform of the oscilloscope's CH2 is ⓑ during the SC PHASE knob turning.
10. Align the burst phase to +90° with the SC PHASE knob of the signal generator SG2 clockwise (↻) slowly. Make sure that the waveform of the oscilloscope's CH2 is ⓑ during the SC PHASE knob turning.
11. If the specification is not met in step 9 or step 10, re-adjust from step 7.
12. Re-align the burst phase to reference position with the SC PHASE knob of the signal generator SG2 clockwise (↻) slowly.



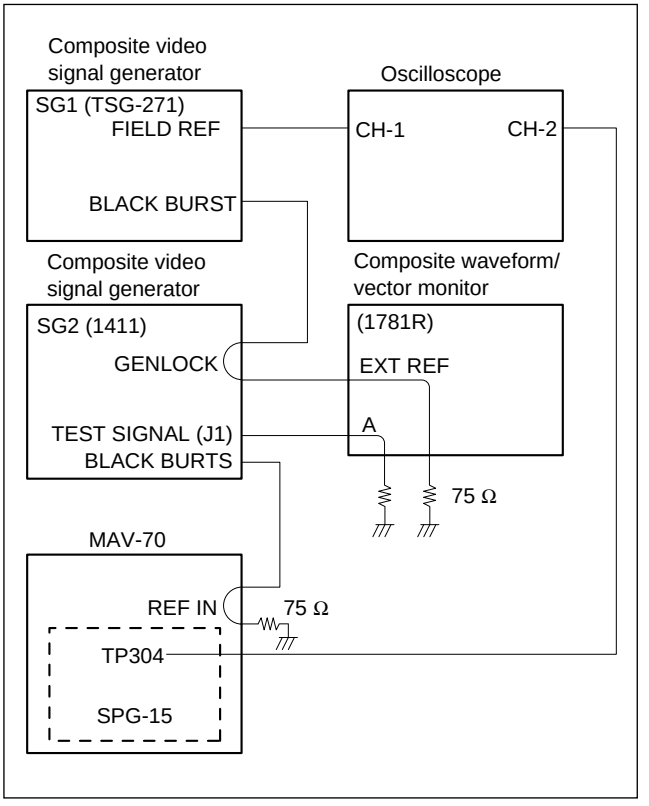




SPG-15 board (A side)

3-2-2. PAL SCH Adjustment

Connection

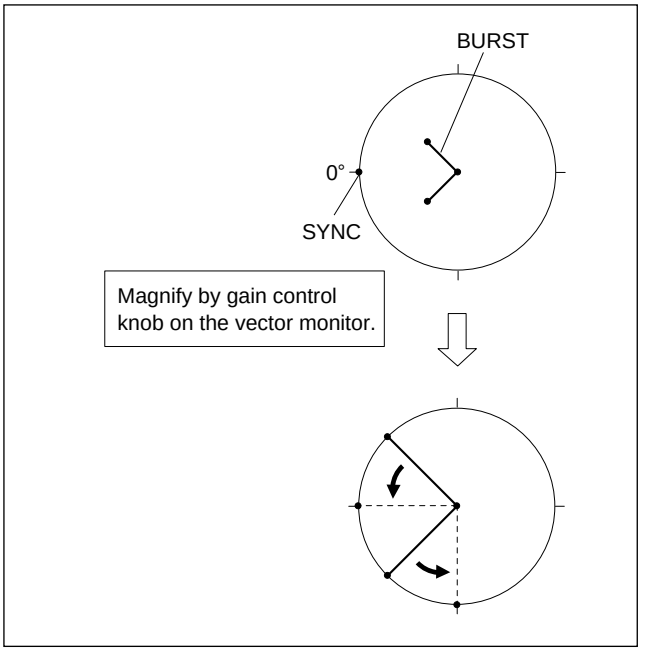


Preparation

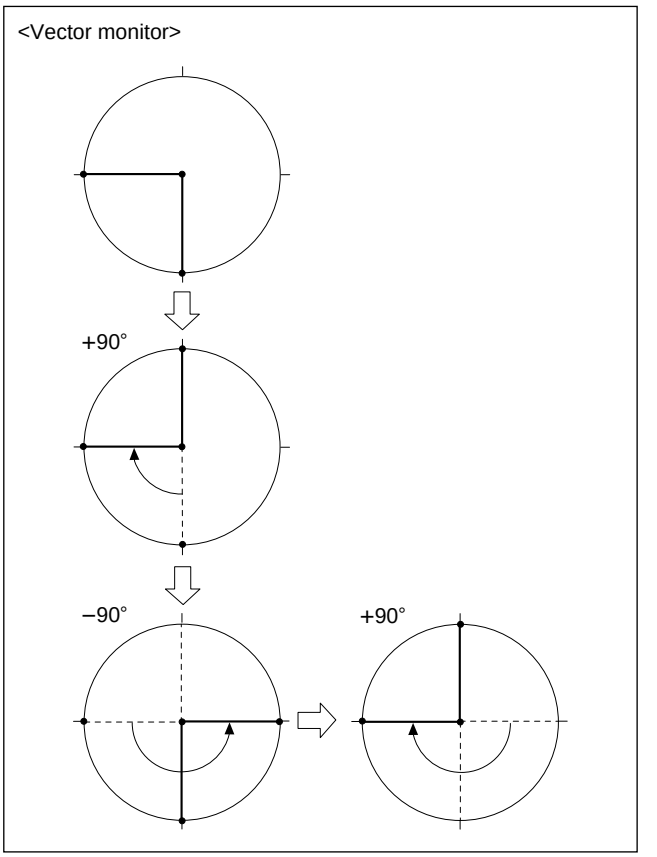
1. Connect the equipment.
2. Turn on the power of the MAV-70 and warm up the unit about 10 minutes.
3. Open the “Board : Parameter Slot 7” menu, and set the Video Type to PAL.
   (For operation, refer to the operation manual.)

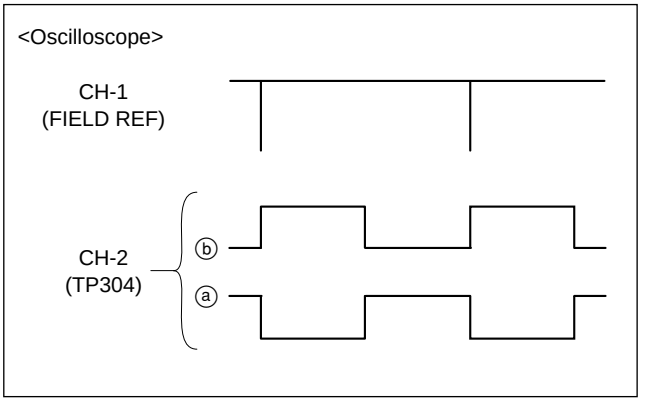
Adjustment Procedures

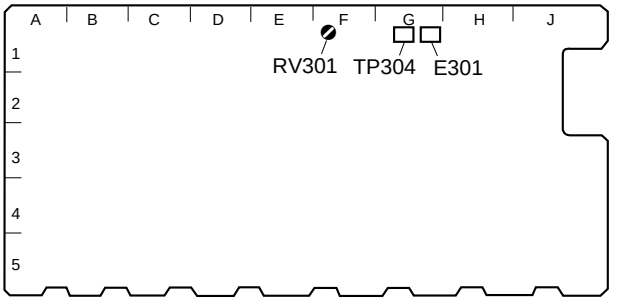
1. Set the equipment.
   - Vector monitor :
     SCH mode, INPUT : CH-A, EXT REF
   - Signal generator SG2 (1411) :
     SYNCHRONIZATION : GEN LOCK
2. Align the SYNC phase to 0˚ with the PHASE knob of the vector monitor so that the beam spot (SYNC) moves in the shortest route.
3. Align the BURST to reference position on the vector monitor with the SC PHASE knob of the signal generator SG2.
4. Align the beam spot of BURST to the circle scale on the vector monitor with the gain control knob on the vector monitor.
5. Align the BURST to the specification positions as the dotted lines shown in the figure with the PHASE knob of the vector monitor.



6. Set the oscilloscope.
   - VOLTS/DIV : DC 2V/DIV (CH-1, CH-2)
   - SEC/DIV : 20 ms/DIV
   - TRIG : CH1
7. Connect the CH2 prove of the oscilloscope to TP304 (G-1), and prove's GND to E301 (G-1).
8. Align the burst phase to +90° with the SC PHASE knob of the signal generator SG2 clockwise (↻) slowly.
9. Turn RV302 (G-1) clockwise (↻) slowly until the waveform of the oscilloscope's CH2 (TP304) change from ⓑ to ⓐ. (Immediately before changing from ⓑ to ⓐ.)
10. Align the burst phase to −90° with the SC PHASE knob of the signal generator SG2 counterclockwise (↺) slowly. Make sure that the waveform of the oscilloscope's CH2 is ⓑ during the SC PHASE knob turning.
11. Align the burst phase to +90° with the SC PHASE knob of the signal generator SG2 clockwise (↻) slowly. Make sure that the waveform of the oscilloscope's CH2 is ⓑ during the SC PHASE knob turning.
12. If the specification is not met in step 10 or step 11, re-adjust from step 8.
13. Re-align the burst phase to reference position with the SC PHASE knob of the signal generator SG2 clockwise (↻) slowly.







SPG-15 board (A side)

3-3. SY-253 Board Adjustment

3-3-1. Audio Output Level (L) Adjustment

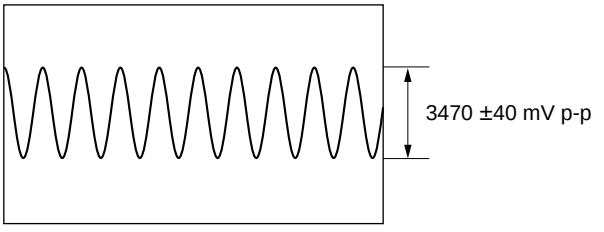
Preparation

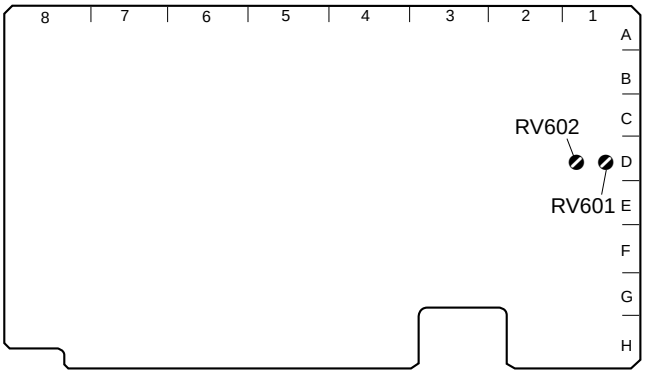
- S602 (D-1)/SY-253 board → 20
- S601 (E-1)/SY-253 board → +4
- Menu setting

(1) Open the "Service : Boards Slot n" menu.
(2) Select "-7-" (SY-253 board) using [←] and [→] buttons.
(3) Set "Moni Slot Sel" to slot number in which the DEC board.

Adjustment procedure

1. Input a −20 dB FS signal of 1 kHz from the AES/EBU IN connector on the ENC-47 or ENC-51 board, and record it.
2. Reproduce the recorded signal.
3. Equipment : Oscilloscope or audio level meter
   Test point : MONITOR OUT L connector/SY-253 board (in 600 Ω load)
   Adj. point : ⊘RV601 (D-1)/SY-253 board
   Spec.: 3470 ±40 mV p-p (4.0 ±0.1 dBm)





SY-253 board (A side)

3-3-2. Audio Output Level (R) Adjustment

Preparation

- S604 (D-1)/SY-253 board → 20
- S603 (E-1)/SY-253 board → +4
- Menu setting

(1) Open the "Service : Boards Slot n" menu.
(2) Select "-7-" (SY-253 board) using [←] and [→] buttons.
(3) Set "Moni Slot Sel" to slot number in which the DEC board.

Adjustment procedure

1. Input a −20 dB FS signal of 1 kHz from the AES/EBU IN connector on the ENC-47 or ENC-51 board, and record it.
2. Reproduce the recorded signal.
3. Equipment : Oscilloscope or audio level meter
   Test point : MONITOR OUT R connector/SY-253 board (in 600 Ω load)
   Adj. point : ⊘RV602 (D-1)/SY-253 board
   Spec. : 3470 ±40 mV p-p (4.0 ±0.1 dBm)

Setting after adjustment

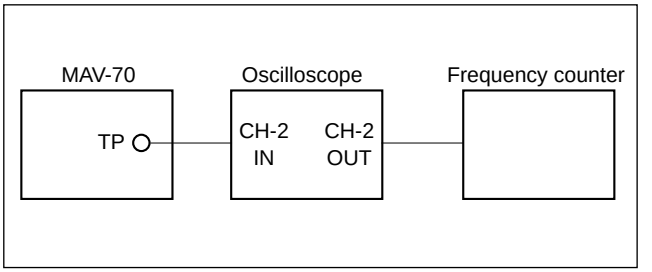
Return the setting of switches and menus to the former state.

3-4. ENC-51 Board Adjustment

3-4-1. VCO Adjustment

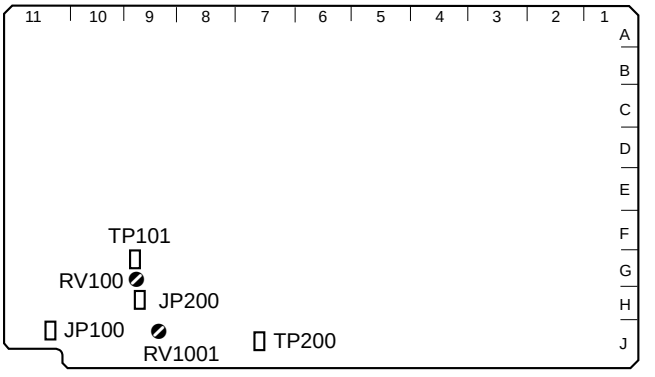
Preparation

- Connect as shown in the figure.
- Disconnect the cable when a cable is connected to the SERIAL V/A INPUT connector (CN101) on the ENC-51 board.
- Short jumpers JP100 (J-11) and JP200 (H-9) on the ENC-51 board by a shorting pin.
- Warm up for about ten minutes.



Adjustment procedure

1. Equipment : Frequency counter and oscilloscope
   Test point : TP101 (G-9)/ENC-51 board
   Adj. point : ⊘RV100 (H-9)/ENC-51 board
   Spec. : 27.0 ±0.1 MHz
2. Equipment : Frequency counter and oscilloscope
   Test point : TP200 (J-7)/ENC-51 board
   Adj. point : ⊘RV1001 (J-9)/ENC-51 board
   Spec. : 27.0 ±0.1 MHz



ENC-51 board (A side)

Setting after adjustment

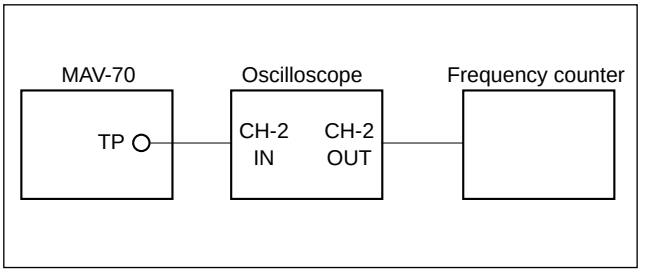
Remove the shorting pin.

3-5. ENC-47 Board Adjustment

3-5-1. VCO Adjustment

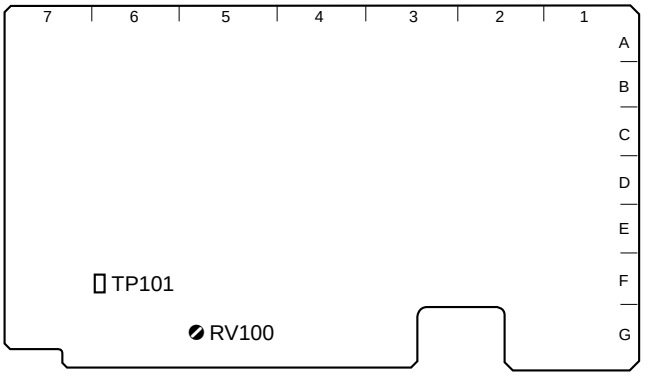
Preparation

- Connect as shown in the figure.
- Disconnect the cable when a cable is connected to the SERIAL V/A INPUT connector (CN101) on the ENC-47 board.
- Warm up for about ten minutes.



Adjustment procedure

Equipment : Frequency counter and oscilloscope
Test point : TP101 (F-6)/ENC-47 board
Adj. point : ⊘RV100 (G-5)/ENC-47 board
Spec. : 27.0 ±0.1 MHz



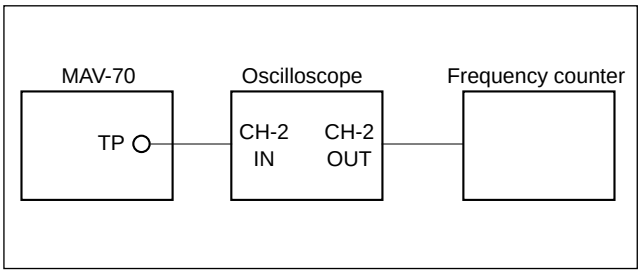
ENC-47 board (A side)

3-6. DEC-98 Board Adjustment

3-6-1. VCO Adjustment

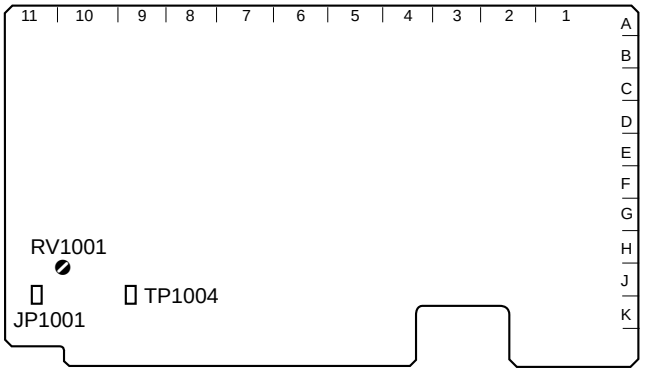
Preparation

- Short jumper JP1001 (J-11) on the DEC-98 board using a shorting pin.
- Connect as shown in the figure.



Adjustment procedure

Equipment : Frequency counter and oscilloscope
Test point : TP1004 (J-9)/DEC-98 board
Adj. point : ⊘RV1001 (J-10)/DEC-98 board
Spec. : 27.0 ±0.1 MHz



ENC-47 board (A side)

3-7. DA-134 Board Adjustment

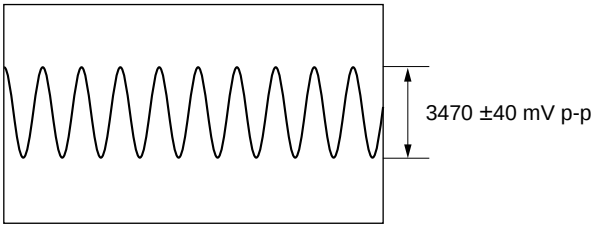
3-7-1. Audio Output Level (CH-1) Adjustment

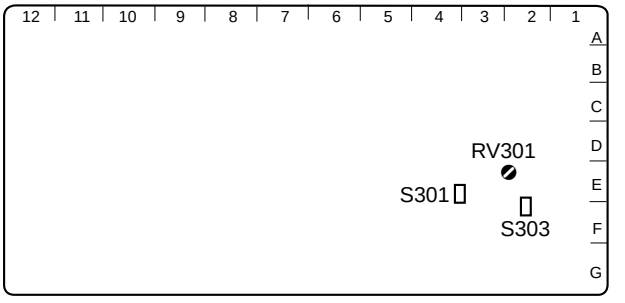
Preparation

- S301 (E-3)/DA-134 board → 20
- S303 (E-1)/DA-134 board → +4

Adjustment procedure

1. Input a −20 dB FS signal of 1 kHz from the AES/EBU IN connector on the ENC-47 or ENC-51 board and record it.
2. Reproduce the recorded signal.
3. Equipment : Oscilloscope or audio level meter
   Test point : AUDIO OUT 2 connector/DEC-98 board (in 600 Ω load)
   Adj. point : ⊘RV301 (E-2)/DA-134 board
   Spec. : 3470 ±40 mV p-p (4.0 ±0.1 dBm)





DA-134 board (A side)

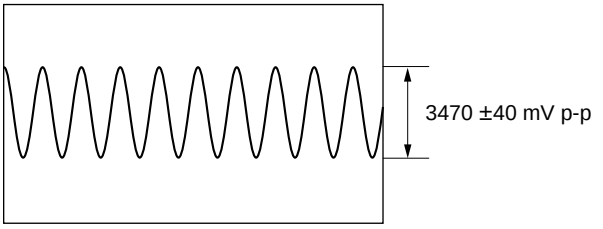
3-7-2. Audio Output Level (CH-2) Adjustment

Preparation

- S302 (E-5)/DA-134 board → 20
- S304 (E-1)/DA-134 board → +4

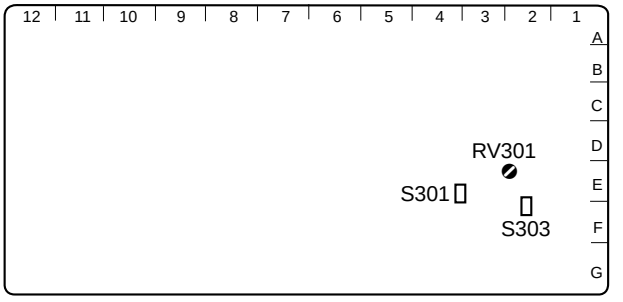
Adjustment procedure

1. Input a −20 dB FS signal of 1 kHz from the AES/EBU IN connector on the ENC-47 or ENC-51 board and record it.
2. Reproduce the recorded signal.
3. Equipment : Oscilloscope or audio level meter
   Test point : AUDIO OUT 1 connector/DEC-98 board (in 600-ohm load)
   Adj. point : ⊘RV302 (E-4)/DA-134 board
   Spec. : 3470 ±40 mV p-p (4.0 ±0.1 dBm)



Setting after adjustment

Return the setting of switches and menus to the former state.

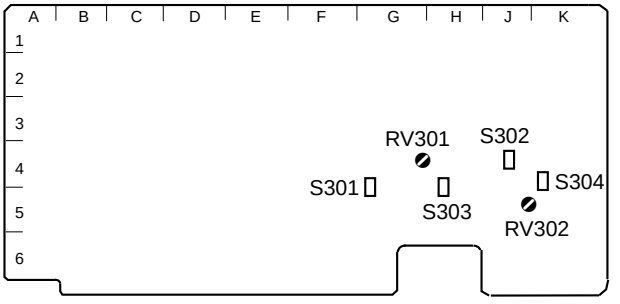


DA-134 board (A side)

3-8. AD-156 Board Adjustment

Preparation

- S301 (G-4)/AD-156 board → +4
- S302 (J-4)/AD-156 board → +4
- S303 (H-4)/AD-156 board → 20
- S304 (K-4)/AD-156 board → 20
- ⊘RV301 (H-4)/AD-156 board → Mechanical center
- ⊘RV302 (K-4)/AD-156 board → Mechanical center
- Input a 4 dBm signal of 1 kHz to the AUDIO INPUT connector on the ENC-47 board.



AD-156 board (A side)

Connection and setting of personal computer

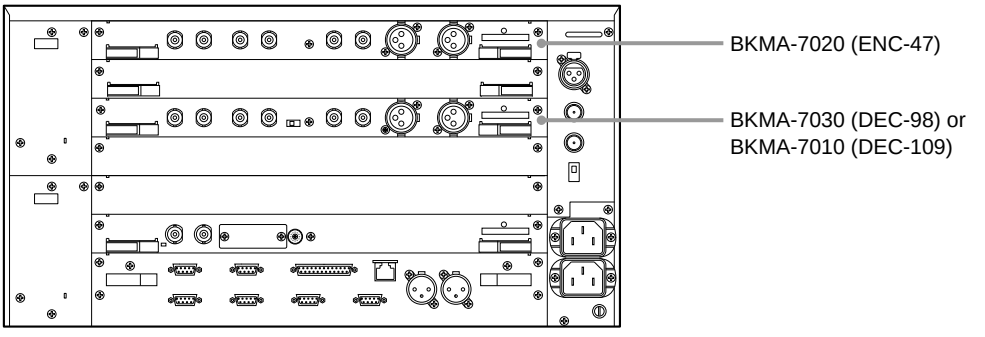
Using a personal computer, put the MAV-70 into the PB mode simultaneously while recording data.

Note

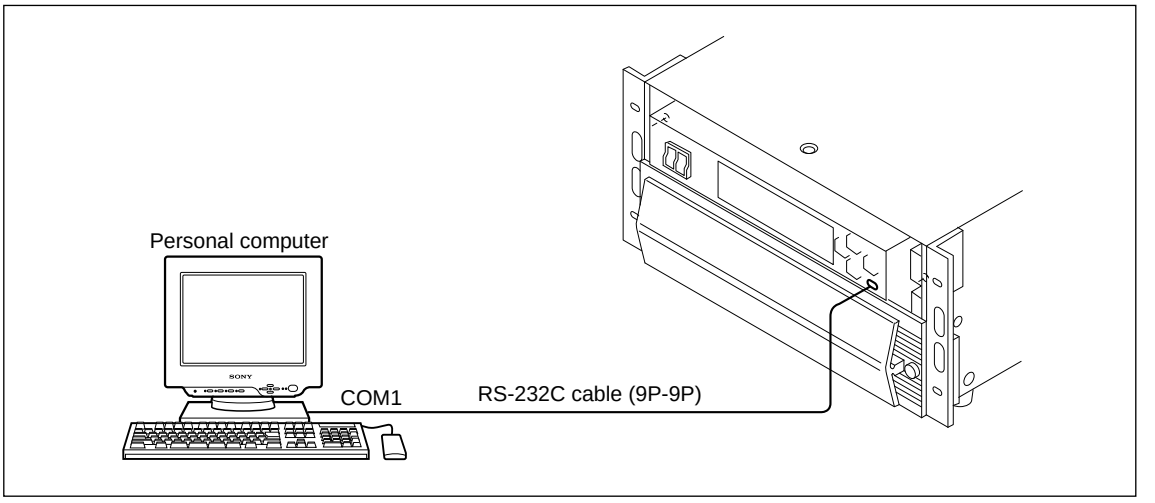
For the display example in using a personal computer, this manual differentiates between the characters displayed on the screen and the characters to be entered as shown below.

Font and style of letters	Display example	Reference for distinction
Times font	UTY>	Automatically displayed message by a program
Helvetica regular (Italic)	*SDC-UTY*	Characters to be entered
Symbols	↵	Enter key
	␣	Space equivalent to a character

Connection example



1. Remove the ornamental panel A. (Refer to Section 1-7 in the Installation Manual of the MAV-70.)
2. Connect the MAV-70 and personal computer.



RS-232C harness

Connector on personal computer side

D-sub 9-pin, male 1-560-651-00 (connector)
1-561-749-00 (shell)

Connector on MAV-70 side

D-sub 9-pin, female 1-562-565-00 (connector)
1-561-749-00 (shell)

・Connector on personal computer side

1	
2	RXD
3	TXD
4	
5	GND
6	
7	
8	
9	

(D-sub 9-pin, male)

・Connector on MAV-70 side

NC	1
RXD	2
TXD	3
NC	4
GND	5
NC	6
NC	7
NC	8
NC	9

(D-sub 9-pin, female)

3. Open the “Service : Boards Slot” menu.
(For operation, refer to the Operation Manual.)

```
 Exit          Service  :  Board Slot 1 ENC
>Param         |
 EXT232C  -1-  -2-  -3-  -4-  -5-  -6-  -7-  -8-
          Rdy  Rdy  Rdy  Reg  Rdy  Rdy  Rdy  Rdy
```

4. Select “EXT232C” using [↑] and [↓] buttons and “-7-” (SY-253 board) using [←] and [→] buttons.

```
 Exit          Service : Board  Slot  7  SY  MAIN
 Param                                      |
>EXT232C  -1-   -2-   -3-   -4-   -5-   -6-   -7-   -8-
          Rdy   Rdy   Rdy   Reg   Rdy   Rdy   Rdy   Rdy
```

5. Press the [ENTER] button several times and display “SY MAIN”.

```
 Exit          Service : Board  Slot  7  SY  MAIN
 Param                                      |
>EXT232C  -1-   -2-   -3-   -4-   -5-   -6-   -7-   -8-
          Rdy   Rdy   Rdy   Reg   Rdy   Rdy   Rdy   Rdy
```

6. Exit the menu.
7. Turn on the power of personal computer and activate Windows 95.
8. Activate the terminal software (Hyperterminal).
9. Set the communication rate.

Communication port	COM1
Baud rate	38,400 bps
Parity	None
Flow control	None
Stop bit length	1
Data bit length	8

10. Open the recording file (e.g., ABC file).

```
Command : DPM␣TOMCP␣DISK␣OPENREC␣01␣00␣00␣ABC ↵
                                 ↑
                                 └── Slot number in which the ENC-47 board is inserted
```

11. Confirm the file handle.

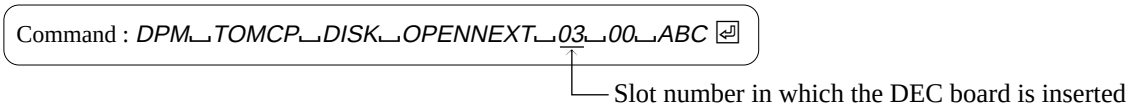
```
Command : DPM␣DUMP␣OPENSTATUS ↵

 Return From MAV-70 :
  PORT=01 : 08  01  01  04
  PORT=02 : 00  00  00  00   ← The third numerical value is a file handle.
  PORT=03 : 00  00  00  00
            ↑
            Slot number
```

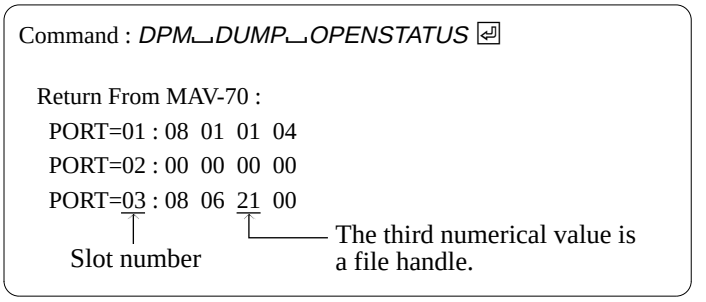
12. Start the recording.

```
Command : DPM␣TOMCP␣DISK␣REC␣01 ↵
                             ↑
                             └── File handle
```

13. Open a playback file with the recording file name as the same name.
(It takes about ten seconds to open the playback file after recording is started.)



14. Confirm the file handle.


Command : DPM␣DUMP␣OPENSTATUS ↵
Return From MAV-70 :
PORT=01 : 08 01 01 04
PORT=02 : 00 00 00 00
PORT=03 : 08 06 21 00
Slot number
The third numerical value is a file handle.

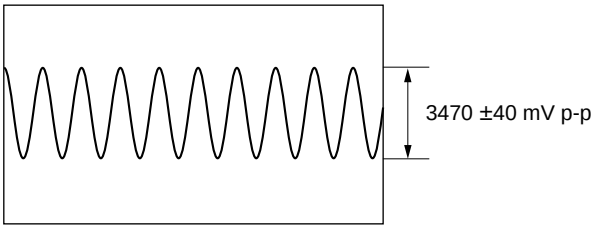
15. Initiate the playback.

Adjustment procedure (when the DA-134 board exists)

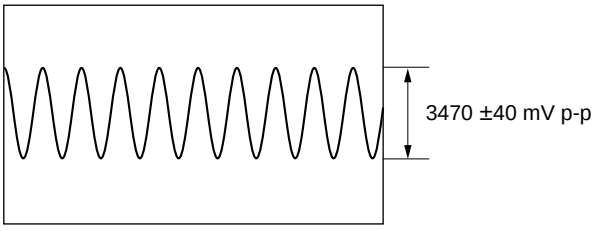
Note

It takes time to playback the recorded point. (Delayed by the time difference between the points when recording is started and when playback is started.)
Turn RV, and then wait a moment and confirm the level.

1. Equipment : Oscilloscope or audio level meter
   Test point : AUDIO OUT 2 connector/DEC-98 board (in 600 Ω load)
   Adj. point : ⊘RV303 (H-3)/AD-156 board
   Spec. : 3470 ± 40 mV p-p (4.0 ± 0.1 dBm)



2. Equipment : Oscilloscope or audio level meter
   Test point : AUDIO OUT 1 connector/DEC-98 board (in 600 Ω load)
   Adj. point : ⊘RV304 (K-3)/AD-156 board
   Spec. : 3470 ± 40 mV p-p (4.0 ± 0.1 dBm)



Adjustment procedure (when the DA-134 board does not exist)

Note

It takes time to playback the recorded point. (Delayed by the time difference between the points when recording is started and when playback is started.)
Turn RV, and then wait a moment and confirm the level.

1. Equipment : Digital audio level meter
   Test point : AUDIO OUT AES/EBU 1/2 connector/DEC-98 board
   Adj. point : ⊘RV303 (H-3)/AD-156 board
   Spec. : −20.0 ± 0.1 dB FS

2. Equipment : Digital audio level meter
   Test point : AUDIO OUT AES/EBU 1/2 connector/DEC-98 board
   Adj. point : ⊘RV304 (K-3)/AD-156 board
   Spec. : −20.0 ± 0.1 dB FS

Setting after adjustment

1. Operate personal computer and stop the recording.

   Command : *DPM␣TOMCP␣DISK␣STOP␣01*↵

2. Close the recording file.

   Command : *DPM␣TOMCP␣DISK␣CLOSE␣01* ↵

3. Stop the playback.

   Command : *DPM␣TOMCP␣DISK␣STOP␣21*↵

4. Close the playback file.

   Command : *DPM␣TOMCP␣DISK␣CLOSE␣21* ↵

5. Return the setting of switches on the board to the former state.

Section 4
Circuit Description

MAV-70

Recording System

The video and audio signals input from the BKMA-7010 (encoder/decoder) and/or BKMA-7020 (encoder) are compressed and recorded on SDRAM of a PCI control circuit. The PCI control circuit on the PU-102 board transfers the SDRAM data on each encoder board to the PU-102 board according to the instructions from the system control block of the MAV-70 and records it on the HDD array.

Playback System

Data is reproduced from the HDD array according to the instructions from the system control block of the MAV-70 and transferred to SDRAM on each decoder board. The compression data recorded on SDRAM of the BKMA-7010 (encoder/decoder) and/or BKMA-7030 (decoder) are expanded, decoded to video and audio signals, and then output.

HDD Array Block

During recording, on the PU-102 board, the compression data sent via a PCI bus is distributed into seven HDDs and then recorded. Simultaneously with recording, parity data is generated and recorded on the parity HDD.
During playback, the data read from seven HDDs is sent through a PCI bus to the decoder. If one HDD can normally read no data due to failure, the data of the defective HDD is recovered based on the data of the parity HDD and remaining six HDDs.

System Control

The disk protocol control signal from a host controller is input from the REMOTE terminal and sent to the DPC (disk protocol controller) CPU (IC513) on the SY-253 board. In the DPC CPU, the disk protocol control signal is hand-shaked and sent through dual-port RAMs (IC501 and IC529) to the main CPU (IC306) as a command. The status is sent from the main CPU to the host controller via a reverse route.
The FSE (file system engine) CPU (IC410) manages the file system database of the file name on the recorded image and the HDD's LBA data. It is controlled by a command (file generation, retrieval, or deletion) that is sent from the main CPU through dual-port RAMs (IC401 and IC423).
The CPU (IC101) on the CCM-37 board controls the 10Base-T Ethernet standard. IC101 sends a command to the main CPU through the dual-port RAMs (IC801 and IC802) on the SY-253 board when the file system is downloaded or uploaded using a personal computer.
Main CPU (IC306) sends a command or receives a status to or from each option board (BKMA-7000 series) or HDD array (PU-102 board) through a PCI controller (IC203) while exchanging commands or status with each CPU above.
The CPU (IC3) on the DP-269 board of the front panel communicates in serial with the main CPU on the SY-253 board via RS-232C, and sends the key switch information or receives the information displayed on the LCD panel.

BKMA-7010 (Encoder/Decoder)

Video System

• Recording Part (ENC-51)

The SDI signal input from the external equipment to the SERIAL V/A INPUT connector is converted into a parallel signal by an SDI encoder (IC100) to produce a digital component signal and sent through a D1 decoder (IC108) to TBC (IC112). The resultant signal is then sent through a VITC reader (IC203) and pre-filter (IC204) to the re-size circuit (IC302) and re-sized to the desired horizontal pixel size. After that, the movement of the signal is detected by ENC3 (IC400). The signal is then converted into MPEG image data by an encoder (IC405) and recorded on the PCI SDRAMs (IC1401 to IC1404).

• Playback Part (DEC-109)

The image data in PCI SDRAM is input through a DMA control circuit (IC201) to MPEG decoders (IC302 and IC402) and decoded to a base band image signal. The two decoders are used for selection and reproduction of the frame precision. The video signal passed through a selector circuit is level-controlled by a video processor (IC603) or a blanking signal is added to the video signal. After that, a VITC and VBI signals are added to the video signal. Moreover, a Video index signal and EDH signals are added to produce an SDI (serial digital interface) signal and then output.

Audio System

• Recording Part (ENC-51)

An SDI embedded audio signal is converted by Audio receiver (IC604) and input to the selector (IC1004).
An AES/EBU signal is decoded by a decoder (IC602) and input to the selector.
One of these two input signals is level-controlled by a DSP circuit (IC902) and audio-compressed by MPEG encoders (IC700 and IC800) after it has been selected. The compressed data is passed through a FIFO circuit and recorded on PCI SDRAMs (IC1401 to IC1404).
One of the input signals described above is passed through a FIFO circuit without compression and recorded on PCI SDRAM when a non-compression audio signal is selected.

• Playback Part (DEC-109)

The audio data in PCI SDRAM is input through a DMA control circuit (IC201) to MPEG audio decoders (IC703, IC705, IC707, and IC709) and decoded to an audio signal. The decoded signal is then level-controlled by DSP circuits (IC802 and IC805). After that, the signal is output as an SDI embedded signal or AES/EBU signal.

Auxiliary Data

• Recording Part (ENC-51)

The VITC data is extracted by a VITC reader (IC203).
The video index data is extracted by a pre-filter (IC204).
The VBI data is directly written in a FIFO circuit (IC501).
The three data above is written in PCI SDRAM through a CPU bus.

• Playback Part (DEC-109)

The auxiliary data in PCI SDRAM is input through a DMA control circuit (IC201) to a FIFO circuit (IC202). The input signal is then added to a video signal as VITC, VBI, and video index signals via a CPU bus.

BKMA-7020 (Encoder)

Video System

The SDI signal input from the external equipment to the SERIAL V/A INPUT connector is converted into a parallel signal by an SDI encoder (IC100) to produce a digital component signal and input through a D1 decoder (IC108) to TBC (IC112).
An analog composite signal is converted by the BKMA-7050 (A/D) board and sent to TBC (IC112).
After an input signal is selected by TBC, it is sent through a setup removal circuit (IC200), VITC reader (IC203), and pre-filter (IC204) to the re-size circuit (IC302) and re-sized to the desired horizontal pixel size. After that, the movement of the signal is detected by ENC3 (IC400). The signal is then converted into MPEG image data by an encoder (IC405) and recorded on the PCI SDRAMs (IC1401 to IC1404).

Audio System

An SDI embedded audio signal is converted by Audio receiver (IC604) and input to the selector (IC1004).
An AES/EBU signal is decoded by a decoder (IC602) and input to the selector.
An analog audio signal is converted by the BKMA-7050 (A/D) board and then input to the selector.
One of these three input signals is level-controlled by a DSP circuit (IC902) and audio-compressed by MPEG encoders (IC700 and IC800) after it has been selected. The compressed data is passed through a FIFO circuit and recorded on PCI SDRAMs (IC1401 to IC1404). One of the input signals described above is passed through a FIFO circuit without compression and recorded on PCI SDRAM when a non-compression audio signal is selected.

Auxiliary Data

The VITC data is extracted by a VITC reader (IC203).
The video index data is extracted by a pre-filter (IC204).
The VBI data is directly written in a FIFO circuit (IC501).
The three data above is written in PCI SDRAM through a CPU bus.

BKMA-7030 (Decoder)

Video System

The image data in PCI SDRAM is input through a DMA control circuit (IC201) to MPEG decoders (IC302 and IC402) and decoded to a base band image signal. The two decoders are used for selection and reproduction of the frame precision. The video signal passed through a selector circuit is level-controlled by a video processor (IC603) or a blanking signal is added to the video signal. After that, a VITC and VBI signals are added to the video signal. Moreover, a video index signal and EDH signals are added for an SDI (serial digital interface) signal and then output. An analog signal is also output by using the BKMA-7060.

Audio System

The audio data in PCI SDRAM is input through a DMA control circuit (IC201) to MPEG audio decoders (IC703, IC705, IC707, and IC709) and decoded from an audio signal to a PCM audio signal. The decoded signal is then level-controlled by DSP circuits (IC802 and IC805). After that, the signal is output as an SDI embedded signal or AES/EBU signal. An analog signal is also output by using the BKMA-7060.

Auxiliary Data

The auxiliary data in PCI SDRAM is input through a DMA control circuit (IC201) to a FIFO circuit (IC202). The input signal is then added to a video signal as VITC, VBI, and video index signals via a CPU bus.

BKMA-7040 (High-speed serial interface)

The MPEG data that is input through PCI (IC300) is recorded on frame memory circuits (IC504 to IC507). The recorded data is then protocol-processed in a fibre channel while the data in a FIFO circuit is controlled by FC CON (IC400), FC-packeted, and then sent.
The received signal is FC-unpacket by FC CON and written in frame memory circuits (IC604 to IC607) as MPEG data. The signal is then output through PCI.
As in the MPEG data, the control data from a system control block is also FC-packeted, and then sent or received.

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SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer :

Check the metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 3.5 mA. Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 5.25 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 20 V AC range are suitable. (See Fig. A)

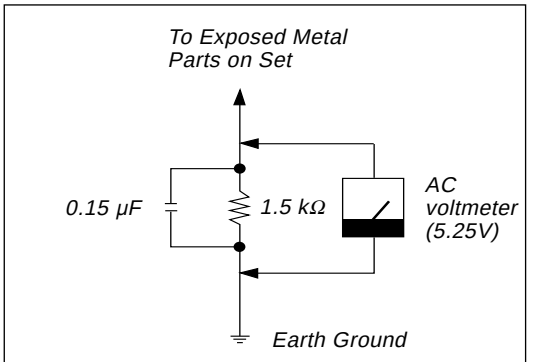

Fig A. Using an AC voltmeter to check AC leakage.

MAV-70 (SY)
BKMA-7010 (SY)
BKMA-7020 (SY)
BKMA-7030 (SY)
BKMA-7040 (SY)
BKMA-7050 (SY)
BKMA-7060 (SY)
BKMA-PS70 (SY) J, E
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